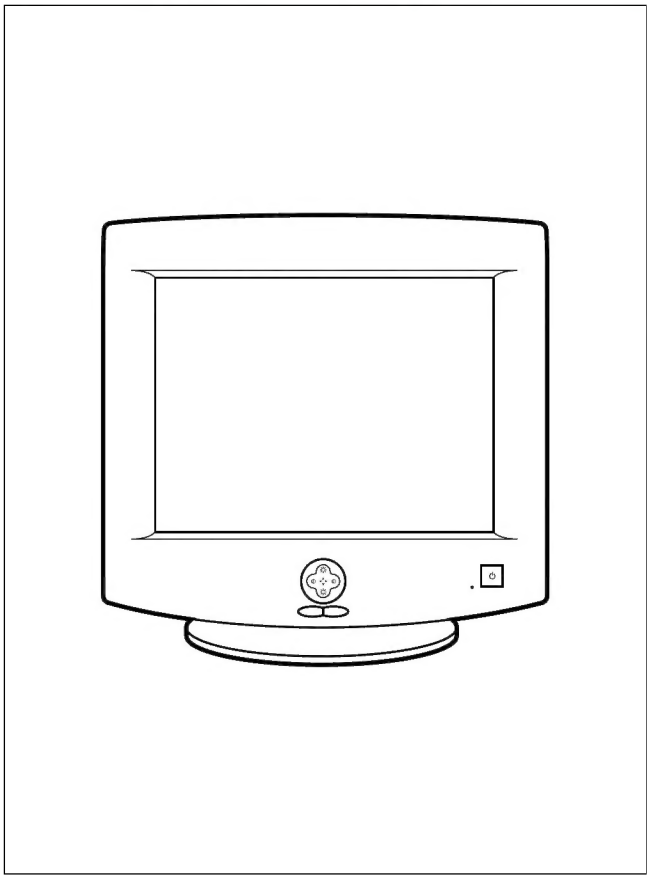
COLOR MONITOR

SyncMaster 1000s (CGP1607L)

SERVICE Manual

COLOR MONITOR



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1 Precautions

1-1 Safety Precautions

WARNINGS

1. For continued safety, do not attempt to modify the circuit board.
2. Disconnect the AC power before servicing.
3. When the chassis is operating, semiconductor heatsinks are potential shock hazards.

1-1-1 Servicing the High Voltage VR and CRT :

WARNING: A high voltage VR replaced in the wrong direction may cause excessive X-ray emissions.

Caution: When replacing the high voltage adjustment VR, it must be fixed by a soldering iron after it is properly set.

1. When servicing the high voltage system, remove the static charge by connecting a 10 kohm resistor in series with an insulated wire (such as a test probe) between the chassis and the anode lead.
2. If the HV VR requires adjustment, (a) Replace the VR and adjust the high voltage to the specification. (b) Use a soldering iron to melt the adjustment cap on the HV VR to prevent any movement.
3. When troubleshooting a monitor with excessively HV, avoid being unnecessarily close to the monitor. Do not operate the monitor for longer than is necessary to locate the cause of excessive voltage.
4. High voltage should always be kept at the rated value, no higher. Only when high voltage is excessive are X-rays capable of penetrating the shell of the CRT, including the lead in glass material. Operation at high voltages may also cause failure of the CRT or high voltage circuitry.
5. When the HV regulator is operating properly, there is no possibility of an X-ray problem. Make sure the HV does not exceed its specified value and that it is regulating correctly.
6. The CRT is especially designed to prohibit X-ray emissions. To ensure continued X-ray protection, replace the CRT only with one that is the same or equivalent type as the original.
7. Handle the CRT only when wearing shatterproof goggles and after completely discharging the high voltage anode.
8. Do not lift the CRT by the neck.

1-1-2 Fire and Shock Hazard :

Before returning the monitor to the user, perform the following safety checks:

1. Inspect each lead dress to make certain that the leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the monitor.
2. Inspect all protective devices such as nonmetallic control knobs, insulating materials, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacitor networks, mechanical insulators, etc.
3. Leakage Current Hot Check (Figure 1-1):
   WARNING: Do not use an isolation transformer during this test.
   Use a leakage current tester or a metering system that complies with American National Standards Institute (*ANSI C101.1, Leakage Current for Appliances*), and Underwriters Laboratories (*UL Publication UL1410, 59.7*).
4. With the unit completely reassembled, plug the AC line cord directly into a 120V AC outlet. With the unit's AC switch first in the ON position and then OFF, measure the current between a known earth ground (metal water pipe, conduit, etc.) and all exposed metal parts, including: metal cabinets, screwheads and control shafts. The current measured should not exceed 0.5 milliamp. Reverse the power-plug prongs in the AC outlet and repeat the test.

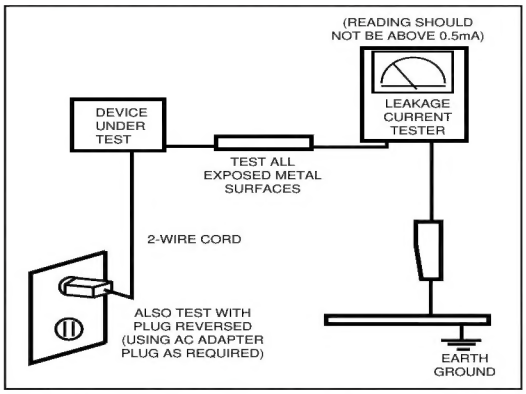

(READING SHOULD NOT BE ABOVE 0.5mA)
LEAKAGE CURRENT TESTER
DEVICE UNDER TEST
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
EARTH GROUND

Figure 1-1. Leakage Current Test Circuit

1-1-4 Product Safety Notices

Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection. The protection they give may not be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by ⚠ on schematics and parts lists. A substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire and / or other hazards. Product safety is under review continuously and new instructions are issued whenever appropriate.

Components identified by ☢ on schematics and parts lists must be sealed by a soldering iron after replacement and adjustment.

1-2 Servicing Precautions

WARNING1: First read the "Safety Precautions" section of this manual. If unforeseen circumstances create conflict between the servicing precautions and safety precautions, always follow the safety precautions.

WARNING2: A high voltage VR replaced in the wrong direction may cause excessive X-ray emissions.

WARNING3: An electrolytic capacitor installed with the wrong polarity might explode.

1. Servicing precautions are printed on the cabinet, and should be followed closely.
2. Always unplug the unit's AC power cord from the AC power source before attempting to: (a) remove or reinstall any component or assembly, (b) disconnect PCB plugs or connectors, (c) connect all test components in parallel with an electrolytic capacitor.
3. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.
4. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the area around the serviced part has not been damaged.
5. Check the insulation between the blades of the AC plug and accessible conductive parts (examples: metal panels, input terminals and earphone jacks).
6. Insulation Checking Procedure: Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500 V) to the blades of the AC plug.

   The insulation resistance between each blade of the AC plug and accessible conductive parts (see above) should be greater than 1 megohm.
7. Never defeat any of the +B voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.
8. Always connect a test instrument's ground lead to the instrument chassis ground *before* connecting the positive lead; always remove the instrument's ground lead last.

1-3 Electrostatically Sensitive Devices (ESD) Precautions

Some semiconductor (solid state) devices can be easily damaged by static electricity. Such components are commonly called Electrostatically Sensitive Devices (ESD). Examples of typical ESD devices are integrated circuits and some field-effect transistors. The following techniques will reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. To avoid a shock hazard, be sure to remove the wrist strap before applying power to the monitor.
2. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of an electrostatic charge.
3. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESDs.
4. Use only a grounded-tip soldering iron to solder or desolder ESDs.
5. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESDs.
6. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
7. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.

   Caution: Be sure no power is applied to the chassis or circuit and observe all other safety precautions.
8. Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushing clothes together, or lifting your foot from a carpeted floor can generate enough static electricity to damage an ESD.
9. ⚠ Indicates ESDs on the Schematic Diagram in this manual.

2 Reference Information

2-1 List of Abbreviations, Symbols and Acronyms

2-1-1 Abbreviations

Abbreviation	Definition
ASS'Y	Assembly
B	Blue
B+ADJ	B+Adjustment
B-CUT	Blue-Cutoff
B-GAIN	Blue Gain
BRIGHT	Brightness
C	R-Composition
C-MIC	Condenser Microphone
CLK	Clock
CM	R-Cement
CN	Connector
CONT	Contrast
D-SUB	D-Subminiature
EEP-CLK	Electrically Erasable and Programmable Clock
EXT	External
EXT-MIC	External Microphone
Freq.	Frequency
FU	Fusible
G	Green
G-CUT	Green-Cutoff
G-GAIN	Green Gain
GND	Ground
H	Horizontal
H	Heater
H-DRV	Horizontal Drive
H-DY	Horizontal Deflection Yoke
H-FLB	Horizontal Flyback
H-FV	Horizontal-Feedback Voltage
H-LIN	Horizontal Linearity
H-POSI	Horizontal Position
H-SIZE	Horizontal Size
H/PHONE	Headphone
Hz	Hertz
I-SENSE	Current-Sense
lb	Pound
MAX	Maximum
MIC	Microphone
MIN	Minimum
MP	C-Metalized Polyester
MPP	Metal Polypropylene
MO	R-Metal Oxide

Abbreviation	Definition
OSC	Oscillator
P	C-Polyester
PARA	Parabola
PARALL	Parallelogram
PIN-BAL	Pincushion Balance
PRE-AMP	Pre-Amplifier
PS1	Power Saving1 (suspend)
PS2	Power Saving2 (off)
PWR	Power
R	Red
R-CUT	Red-Cutoff
R-GAIN	Red Gain
RST	Reset
S-PIN	Side Pincushion
S-RASTER	Self Raster
S/W	Switch
SCAP	S Correction Capacitor
SPK	Speaker
SYNC	Synchronization
T	C-Tantalum
TR	Transistor
TRAP	Trapezoid
U-COM	Microprocessor
V	Vertical
V-DY	Vertical Deflection Yoke
V-FLB	Vertical Flyback
V-LIN	Vertical Linearity
V-MUTE	Video Mute
V-OUT	Vertical Output
V-PARA	Vertical Parabola
V-POL	V-Polarity
V-POSI	Vertical Position
V-SENSE	Voltage-Sense
V-SIZE	Vertical Size
WW	R-Wire Wound
X-TAL	Crystal
Ω	ohm
KΩ	1000 ohm
MΩ	1000 KΩ
uF	microfarad (10^{-6}F)
nF	nanofarad (10^{-9}F)
pF	picofarad (10^{-12}F)

2-1-2 Symbols

- Can emit X-radiation
- Hot Ground
- Cold Ground
- Electrostatically Sensitive Device (ESD)
- Provides special safety considerations

2-1-2 Acronyms

Acronym	Definition
ABL	Automatic Brightness Limits
AC	Alternating Current
ACL	Automatic Contrast Limit
AFC	Automatic Frequency Control
ANSI	American National Standards Institute
CMOS	Complementary Metal Oxide Semiconductor
CRT	Cathode Ray Tube
DC	Direct Current
DDC	Data Display Channel
DF	Dynamic Focus
DMM	Digital Multimeter
DPMS	Display Power Management Signaling
DVM	Digital Voltmeter
DY	Deflection Yoke
EEPROM	Electrically Erasable and Programmable Read only Memory
ESD	Electrostatically Sensitive Device
ESF	Electronic Static Field
FBT	Flyback Transformer
FET	Field Effect Transistor
FH	Horizontal Frequency
FS	Fail Safe
FV	Vertical Frequency
GD	Geometric Distortion

Acronym	Definition
H/V	Horizontal/Vertical
HV	High Voltage
I/O	Input/Output
IC	Integrated Circuit
LED	Light Emitting Diode
MAC	Macintosh
MOFA	Mask Outside Frame Assembly
OCP	Over Current Protection
OP AMP	Operational Amplifier
OSD	On Screen Display
P-P	Peak to Peak
PCB	Printed Circuit Board
PLL	Phase Locked Loop
PWM	Pulse Width Modulation
SMPS	Switch Mode Power Supply
SVGA	Super Video Graphics Array
SWEDAC	
TP	Test Point
UL	Underwriters Laboratories
USB	Universal Serial Bus
VESA	Video Electronics Standard Association
VGA	Video Graphics Array
VR	Variable Registor
W/B	White Balance

3 Product Specifications

3-1 Specifications

Item	Description
Picture Tube:	21-Inch (53 cm): 19.7-inch (50 cm) viewable, Full-square flat-face tube, 90° Deflection, 0.28 mm Dot pitch, Dark-tint, Non-glare, Anti-reflection and Anti-static charge coating
Scanning Frequency	Horizontal : 30 kHz to 96 kHz (Automatic) Vertical : 50 Hz to 160 Hz (Automatic)
Display Colors	Unlimited colors
Maximum Resolution	Horizontal : 1600 Dots Vertical : 1200 Lines
Input Video Signal	Analog, 0.714 Vp-p positive at 75 Ω, internally terminated
Input Sync Signal	Separate Sync : TTL level positive/negative Sync-on-green : Composite Sync 0.286 Vp-p ±5%/ negative (video on Vp-p positive) Composite Sync : TTL level positive/negative
Maximum Pixel Clock rate	205 MHz
Active Display	Horizontal : 390 mm ± 3 mm (4:3 ratio)/366 mm ± 3 mm (5:4 ratio) Vertical : 292.5 mm ± 3 mm
Input Voltage	AC 90-132 / 198-264 Volts, 60/ 50 Hz ± 3 Hz
Power Consumption	150 Watt (max)
Dimensions Unit (W x D x H) Carton (W x D x H)	 19.3 x 19.9 x 20.1 Inches (490 x 505 x 510 mm) 24.1 x 25.0 x 25.3 Inches (612 x 633 x 642 mm)
Weight	Net/Gross : 70.6 lbs (32 kg) / 79.4 lbs (36 kg)
Environmental Considerations	Operating Temperature : 32°F to 104°F (0°C to 40°C) Humidity : 10 % to 80 % Storage Temperature : -4°F to 113°F (-20°C to 45°C) Humidity : 5 % to 95 %

- The SyncMaster 1000s (CGP1607L) complies with SWEDAC (MPR II) recommendations for reduced electromagnetic fields.
- Designs and specifications are subject to change without prior notice.

3-2 Pin Assignments

Sync Type / Pin No.	15-Pin Signal Cable Connector (Figure 3-1)			Cable Adapter (Figure 3-2)
	Separate	Composite	Sync-On Green	Macintosh
1	Red	Red	Red	GND-R
2	Green	Green	Green + H/V Sync	Red
3	Blue	Blue	Blue	H/V Sync
4	GND	GND	GND	Sense 0
5	DDC Return	DDC Return	DDC Return	Green
6	GND-R	GND-R	GND-R	GND-G
7	GND-G	GND-G	GND-G	Sense 1
8	GND-B	GND-B	GND-B	Reserved
9	Reserved	Reserved	Reserved	Blue
10	GND-Sync/Self-raster	GND-Sync/Self-raster	GND-Sync/Self-raster	Sense 2
11	GND	GND	GND	GND
12	DDC Data	DDC Data	DDC Data	V-Sync
13	H-Sync	H/V-Sync	Not Used	GND-B
14	V-Sync	Not Used	Not Used	GND
15	DDC Clock	DDC Clock	DDC Clock	H-Sync

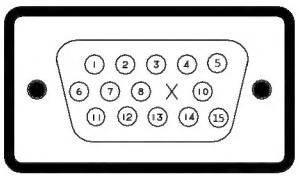


Figure 3-1. Male Type

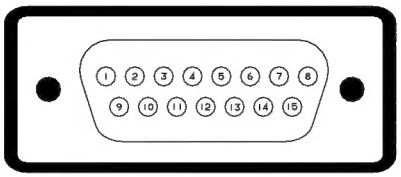


Figure 3-2. Male Type

BNC Connectors

BNC connectors are used with coaxial cable for improved signal transmission. Better signal transmission becomes critical at high frequencies, such as those required for 1280 x 1024 resolution. Most video boards that operate at 1280 x 1024 resolution recommend using coaxial cable with BNC connectors. The 5 BNC connectors on the rear of the monitor can accept Red, Green and Blue video. Composite sync can be applied separately, or combined with the Green video signal (commonly referred to as "composite sync-on green"). If composite sync-on green is used, then only 3 of the 5 BNC connectors are used. The connectors are labeled accordingly.

Pin Assignment	Signals		
	Sync-on-Green	Composite Sync	Separate Sync
1	Red	Red	Red
2	Green + Sync	Green	Green
3	Blue	Blue	Blue
4	NC	H/V Comp. Sync	H-Sync
5	NC	NC	V-Sync

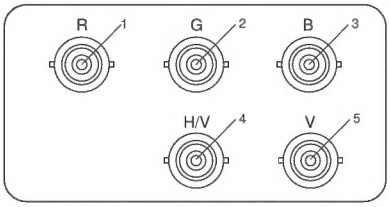


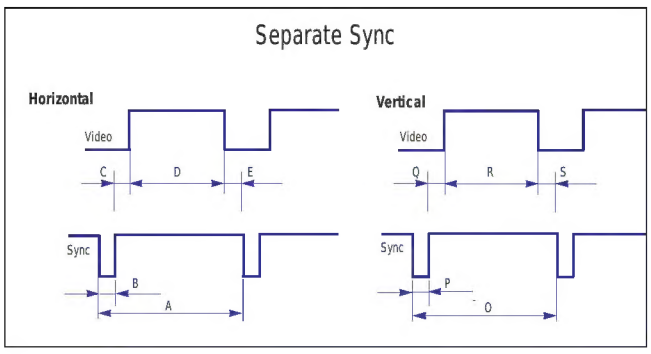
Figure 3-3. BNC Signal Input Type

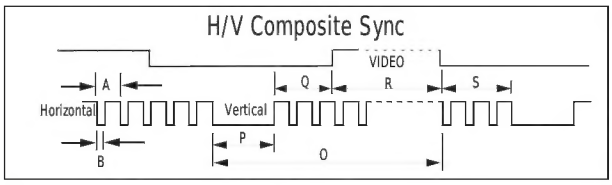
3-3 Timing Chart

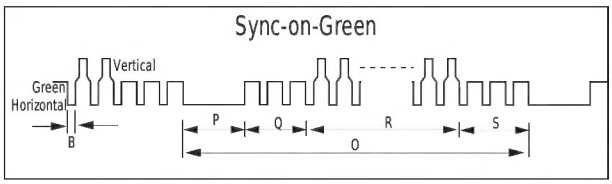
This section of the service manual describes the timing that the computer industry recognizes as standard for computer-generated video signals.

Table 3-1. Timing Chart

Mode / Timing	IBM		VESA							MAC.
	VGA2/70Hz 720 x 400	VGA3/60Hz 640 x 480	640/85 Hz 640 x 480	800/85 Hz 800 x 600	1024/85 Hz 1024 x 768	1024/100 Hz 1024 x 768	1280/75 Hz 1280 x 1024	1280/85 Hz 1280 x 1024	1600/75 Hz 1600 x 1200	1152/75 Hz 1152 x 870
fH (kHz)	31.469	31.469	43.269	53.674	68.677	81.400	79.976	91.146	93.750	68.681
A µsec	31.777	31.778	23.111	18.631	14.561	12.285	12.504	10.971	10.667	14.560
B µsec	3.813	3.813	1.556	1.138	1.016	0.988	1.067	1.016	0.948	1.280
C µsec	1.589	1.589	2.222	2.702	2.201	1.624	1.837	1.422	1.501	1.440
D µsec	25.422	25.422	17.778	14.222	10.836	9.037	9.481	8.127	7.901	11.520
E µsec	0.318	0.318	1.556	0.569	0.508	0.635	0.119	0.406	0.316	0.320
fV (Hz)	70.087	59.940	85.008	85.061	84.997	100.000	75.025	85.024	75.000	75.062
O msec	14.268	16.683	11.764	11.756	11.765	10.000	13.329	11.761	13.333	13.322
P msec	0.064	0.064	0.069	0.056	0.044	0.037	0.038	0.033	0.032	0.044
Q msec	0.858	0.794	0.578	0.503	0.524	0.516	0.475	0.483	0.491	0.568
R msec	12.711	15.253	11.093	11.179	11.183	9.435	12.804	11.235	12.800	12.667
S msec	0.191	0.064	0.023	0.019	0.015	0.012	0.013	0.011	0.011	0.044
Clock Freq. (M Hz)	28.322	25.175	36.000	56.250	94.500	113.309	135.000	157.50	202.500	100.000
Polarity H.Sync	Negative	Negative	Negative	Positive	Positive	Negative	Positive	Positive	Positive	Negative
V.Sync	Positive	Negative	Negative	Positive	Positive	Positive	Positive	Positive	Positive	Negative
Remark	Separate	Separate	Separate	Separate	Separate	Separate	Separate	Separate	Separate	SOG







A : Line time total	B : Horizontal sync width	O : Frame time total	P : Vertical sync width
C : Back porch	D : Active time	Q : Back porch	R : Active time
E : Front porch		S : Front porch	

Memo

4 Opearating Instructions

4-1 Controls and Connectors

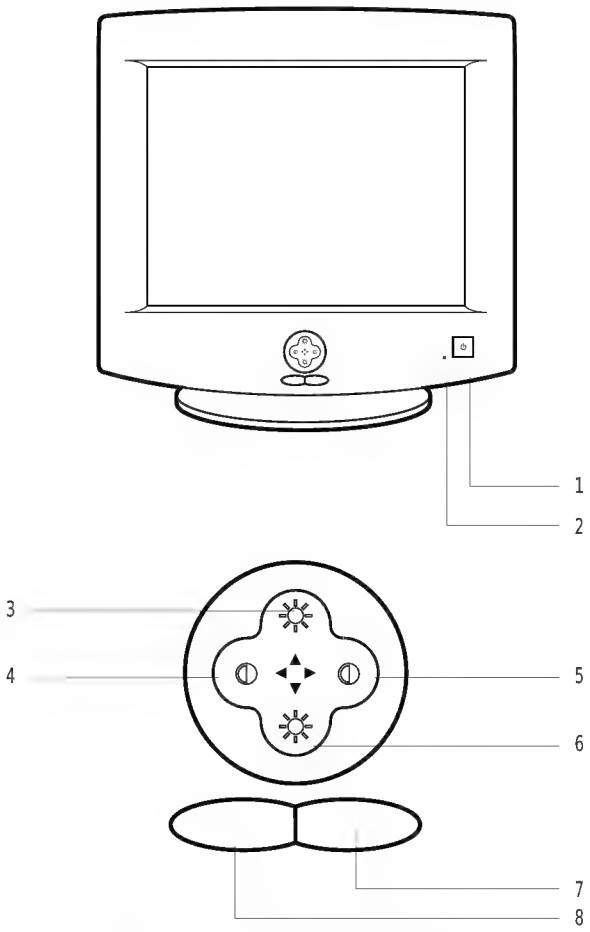


Figure 4-1. Front View and Controls

Table 3-1. Front Panel Controls

Location	Symbol	Description
1	⏻	Power Button
2	●	Power Indicator LED (Dual Color)
3	▲	Up Button
4	◀	Left Button
5	▶	Right Button
6	▼	Down Button
7	⬭	Menu (↵) Button
8	⬭	Exit Button

4-2 Power Management System

This monitor has a built-in power management system called PowerSaver. This system saves energy by switching your monitor into a low-power mode when it has not been used for a certain amount of time. The available modes are "On," "Standby," "Suspend," and "Off."

This system operates with a VESA DPMS compliant video card installed in your computer. You use a software utility installed on your computer to set up this feature. See the table below for details.

Note 1: This monitor automatically returns to normal operation when horizontal and vertical sync return. This occurs when you move the computer's mouse or press a key on the keyboard.

Table 4-2. Display Power Management Signaling (DPMS)

State / Items	Normal Operation	Power Saving Function EPA/NUTEK		
		Standby Mode	Suspend Mode/ Position A1	Power-off Mode/ Position A2
Horizontal Sync	Active	Inactive	Active	Inactive
Vertical Sync	Active	Active	Inactive	Inactive
Video	Active	Blanked	Blanked	Blanked
Power Indicator	Green	Orange	Orange/Green Blinking	Orange Blinking
Power Consumption	150 W (max.) 130 W (nominal)	130 W (max) 110 W (nominal)	Less than 15 W	Less than 5 W

Note 2: This monitor is EPA Energy Star compliant and NUTEK compliant when used with a computer equipped with VESA DPMS functionality. If your computer system cannot support a display power management function, you can purchase an optional DPMS software program to enable the power saving function. Please contact Samsung or your dealer for more information.

Note 3: For energy conservation, turn your monitor OFF when it is not needed, or when leaving it unattended for long periods.

5 Disassembly and Reassembly

This section of the service manual describes the disassembly and reassembly procedures for the SyncMaster 1000s (CGP1607L) monitor.

WARNING: This monitor contains electrostatically sensitive devices. Use caution when handling these components.

5-1 Disassembly

Cautions: 1. Disconnect the monitor from the power source before disassembly.
2. Follow these directions carefully; never use metal instruments to pry apart the cabinet.

5-1-1 Disassembling the Cabinet

1. To uncover the 2 uppermost screws, press in the end of each Screw Cap and pull it away from the cabinet.
2. Remove the 4 screws on the Rear Cover and pull it backward to remove it.

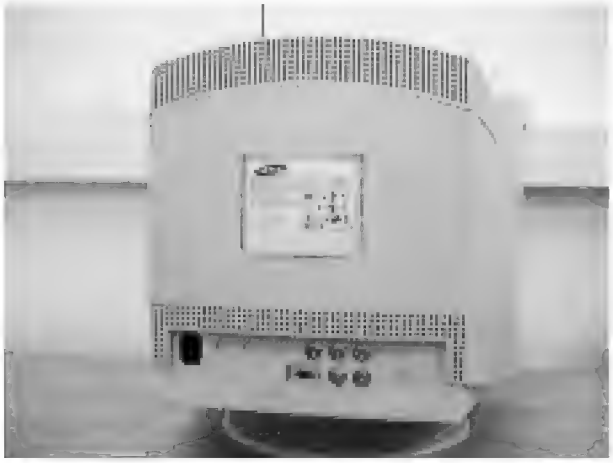


Figure 5-1

3. Remove the 6 screws on the Top Shield Cover and remove it.

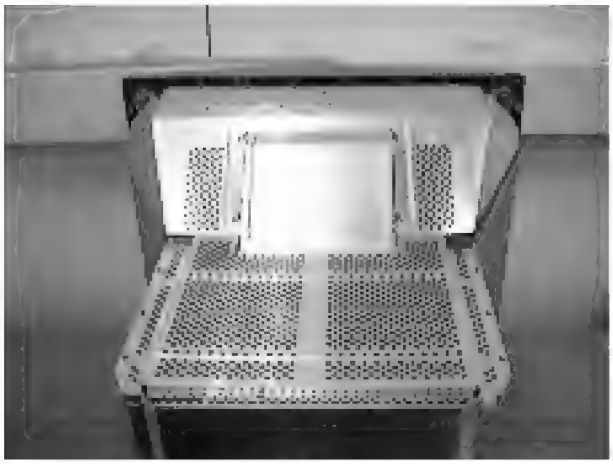


Figure 5-2

4. Remove the 6 screws and Chassis ground wire on the side of both the Left and Right Shield and remove the Shields.

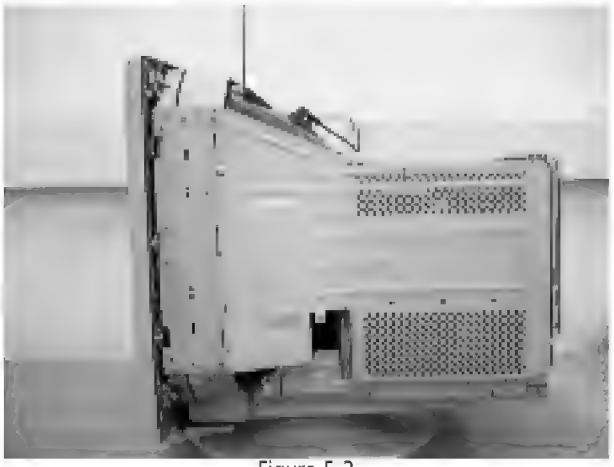


Figure 5-3

5. Remove both side screws on the lower edge of the Stand Assembly and pull the assembly towards you to remove it.

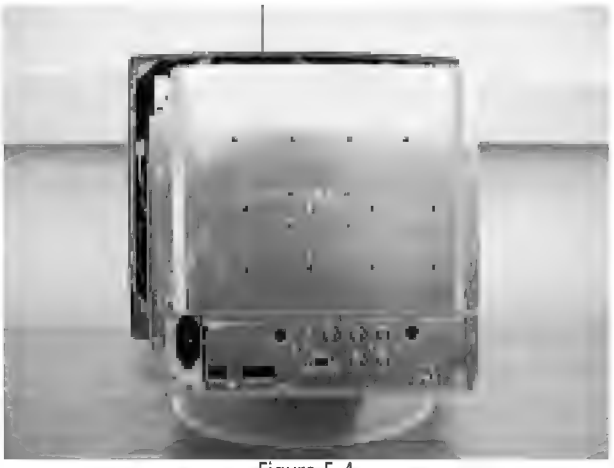


Figure 5-4

5-1-2 Removing the Entire PCB Assembly

1. Complete all previous steps.
2. Using pinch-nosed pliers or long-nosed pliers, carefully disconnect the Anode Cap from the CRT.
3. Disconnect connector GTP901 on the CRT Socket PCB.
4. Disconnect the CRT Socket PCB Assembly.
5. Disconnect connectors CN401_1~CN401_4, C301_1~CN301_3, CN403, CN404 and CN405 on the Main PCB and CN605, CN606 on the Power PCB.

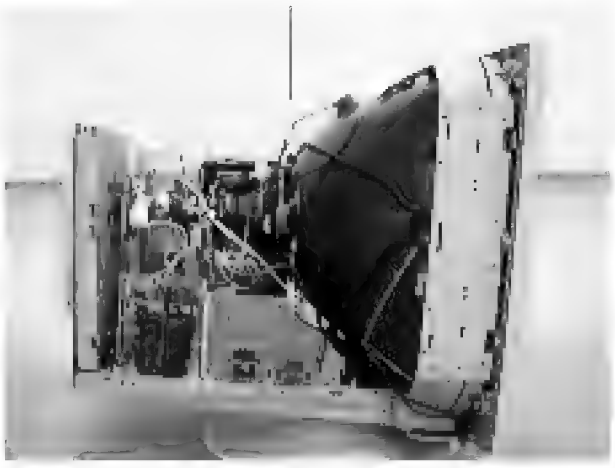


Figure 5-5

6. Remove the 3 screws on the Main PCB Chassis Bracket.
7. Lift off the entire PCB Assembly and place it on a flat, level surface that is protected from Static electricity.

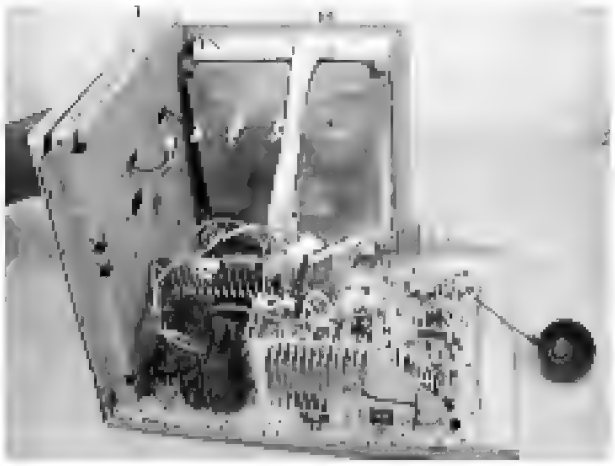


Figure 5-6

5-1-3 Removing the CRT Socket PCB

1. Complete all previous steps.
2. Disconnect connectors CN104B, CN104RG and G2 (GTP902) on the CRT Socket PCB.
3. Hold the CRT Socket PCB Assembly while you lift the Cap on the CRT Socket and desolder the two focus wires.

5-1-4 Removing the Video PCB

1. Complete all previous steps.
2. Disconnect connector CN801 on the Video PCB.
3. Remove both side screws on the Video PCB Assembly Rear Shield.
4. Lift off the Video PCB Assembly.

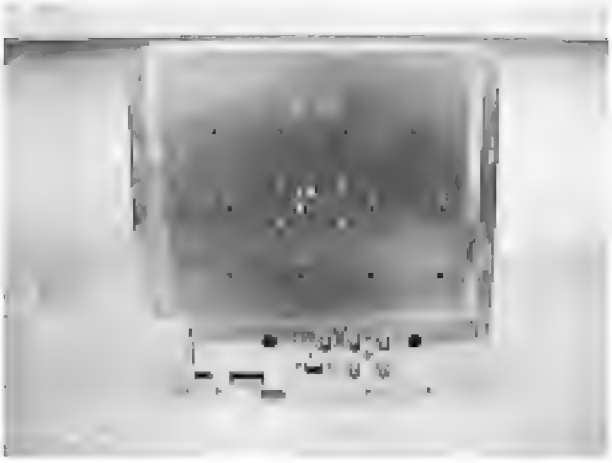


Figure 5-7

5. Remove all screws on the Video PCB Assembly and remove the Video Shield.
6. Remove the 3 screws on the Video PCB.
7. Lift out the Video PCB and place it on a flat, level surface that is protected from static electricity.

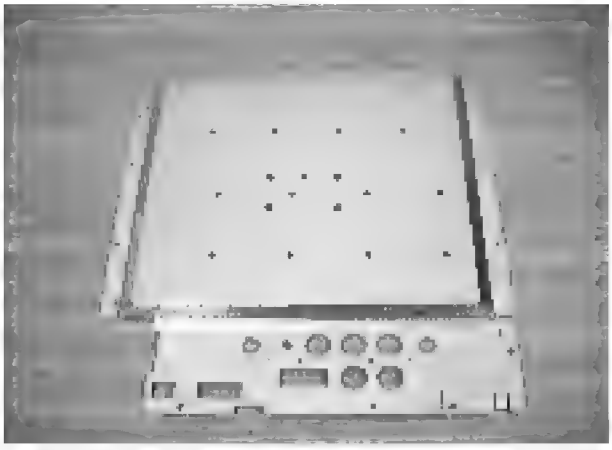


Figure 5-8

5-1-5 Removing the Power PCB

1. Complete all previous steps.
2. Disconnect CN603 on the Power PCB.
3. Remove the screw on the lower side of the SMPS Bracket.
4. Lift off the Power PCB Assembly.
5. Remove the Shield Cover and disconnect CN601 on the Power PCB.

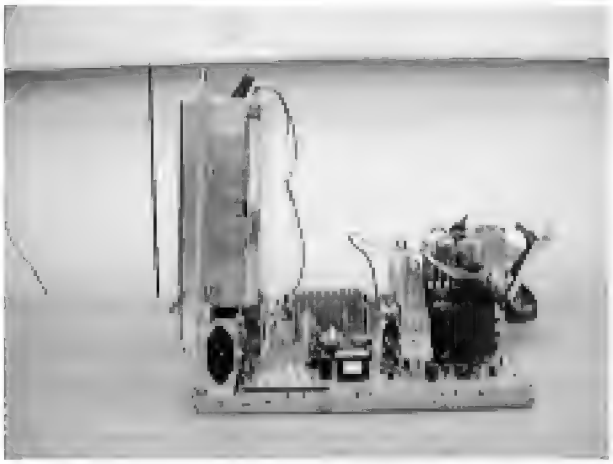


Figure 5-9

6. Remove the 4 screws on the Power PCB.
7. Lift out the Power PCB and place it on a flat, level surface that is protected from static electricity.

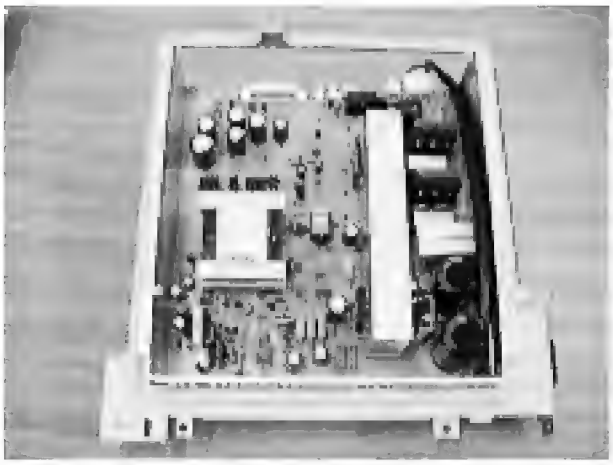


Figure 5-10

5-1-6 Removing the Main PCB

1. Complete all previous steps.
2. Remove the 7 screws on the Main PCB.
3. Carefully lift out the Main PCB and place it on a flat, level surface that is protected from static electricity.

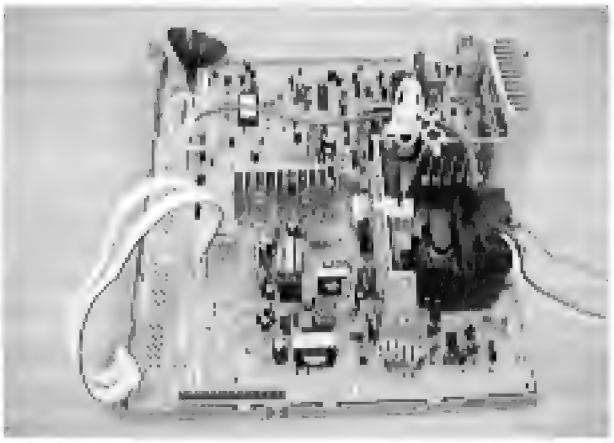


Figure 5-11

5-1-7 Disassembling the CRT Assembly

1. Complete all previous steps.

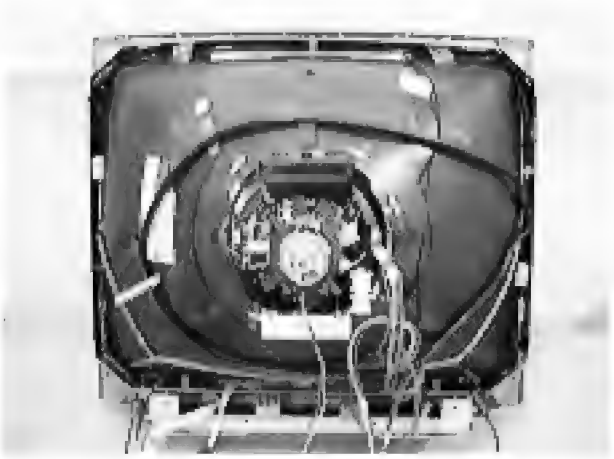


Figure 5-12

2. Remove the 1 screw on the CRT frame.
3. Remove the 2 screws on the Bottom frame.
4. Remove the other 10 screws and lift off the CRT frame.
5. Straighten the Degaussing Coil Assembly coated metal ties and lift the Coil from the CRT.
6. Lift the CRT up and away from the Front Cover Assembly and place it on a padded surface.

⚠ Do not lift the CRT by the neck.

5-2 Reassembly

Reassembly procedures are in the reverse order of Disassembly procedures.

6 Alignment and Adjustments

This section of the service manual explains how to make permanent adjustments to the monitor. Direction is given for adjustment using the RS232C Serial Communications Adapter and software.

6-1 Adjustment Conditions

Caution: Changes made without the SoftJ ig are saved only to the user mode settings. As such, the settings are not permanently stored and may be inadvertently deleted by the user.

6-1-1 Before Making Adjustments

6-1-1 (a) ORIENTATION

When servicing, always face the monitor to the east.

6-1-1 (b) MAGNETIC FIELDS

Whenever possible, use magnetic field isolation equipment such as a Helmholtz field to surround the monitor. If a Helmholtz field is not available, frequently degauss the unit under test.

Caution: Other electrical equipment may cause external magnetic fields which may interfere with monitor performance.

Use an external degaussing coil to limit magnetic build up on the monitor. If an external degaussing coil is not available, use the internal degaussing circuit. However, do not use the internal degaussing circuit more than once per 30 minutes.

6-1-1 (c) WARM-UP TIME

The monitor must be on for 30 minutes before starting alignment. Warm-up time is especially critical in color temperature and white balance adjustments.

6-1-1 (d) SIGNAL

Analog, 0.714 Vp-p positive at 75 ohm, internal termination
Sync: Separate/Composite
(TTL level negative/positive)

Sync-on-Green:
Composite sync 0.286 Vp-p negative
(Video 0.714 Vp-p positive)

6-1-1 (e) SCANNING FREQUENCY

Horizontal: 30 kHz to 96 kHz
Vertical: 50 Hz to 160 Hz

All modes must be individually adjusted and adjustments saved. This monitor does not automatically adjust each mode.

Refer to Table 3-1 on page 3-3.

6-1-1 (f) HIGH VOLTAGE AND +B 195V LINE ADJUSTMENT

Signal: 1024 x 768 mode (68 kHz/85 Hz)
Display image: Full white
Contrast: Maximum
Brightness: Maximum
Limit: 27.5 kV ± 0.5 kV

Measure the high voltage level at the anode cap. High voltage should be within the limit as above. If the high voltage needs adjustment use the following procedure:

PROCEDURE

1. Adjust VR501 on the Main PCB so that the high voltage measures 27.5 kV ± 0.5 kV.
2. Using a soldering iron, melt the adjustment cap on VR501 to prevent any movement.

6-1-1 (g) G2 (SCREEN) VOLTAGE ADJUSTMENT

Signal: 1024 x 768 mode (68 kHz/85 Hz)
Display image: Crosshatch pattern
Contrast: Maximum
Brightness: Maximum

Adjust the Screen VR of the FBT so that the G2 (Screen) Voltage for Hitachi is 530 V ± 10 V.

6-1-1 (h) CENTER RASTER

Signal: 1024 x 768 mode (68 kHz/85 Hz)
Display image: Crosshatch pattern
Contrast: Maximum
Brightness: Maximum

Adjust VR401 so that the back raster comes to the center.

6-1-1 (i) BRIGHTNESS AND CONTRAST

Unless otherwise specified, adjust control buttons:

Brightness: Maximum

Contrast: Maximum

6-1-2 Required Equipment

The following equipment may be necessary for adjustment procedures:

6-1-2 (a) DISPLAY CONTROL ADJUSTMENT

1. Non-metallic (–) screwdriver: 1.5 mm
   Non-metallic (–) screwdriver: 3 mm
2. Philips (+) screwdriver: 1.5 mm
3. Non-metallic hexkey: 2.5 mm
4. Digital Multimeter (DMM), or
   Digital Voltmeter (DVM)
5. Signal generator, or
   Computer with a video board that uses the ET-4000 chipset (strongly recommended if using Samsung DM 200 software) and that displays: 1280 x 1024 @ 85 Hz, or 1600 x 1200 @ 85 Hz (maximum).
6. Personal computer
7. Required software: Softjig.exe from Samsung which includes the cg17p.c data file Samsung DM200, or DisplayMate for Windows from Sonera Technologies
8. Interface Board Ver. 2.0 Code No. BH81-90001K
9. Parallel communications cable (25-pin to 25-pin); Code No. BH81-90001H
10. Signal cable (15-pin to 15-pin cable with additional 3-pin connector); Code No. BH81-90001J
11. 5 V DC adapter, not supplied

Note: SoftJig Ass'y (includes items 8, 9 and 10) Code No. BH81-90001L

6-1-2 (b) COLOR ADJUSTMENTS

1. All equipment listed in 6-1-2 (a), above
2. Color analyzer, or any luminance measurement equipment

6-1-3 Connecting the SoftJig

Connect the monitor to the signal generator and/or PC as illustrated in Figures 6-1 and 6-2.

Note: The signal cable connector which includes the 3-wire cable must connect to the monitor. If you use Setup 2 (PC only, no signal generator) you can only make adjustments to the signal timing available on that computer system. To make corrections to all factory timings requires the use of an additional signal generator.

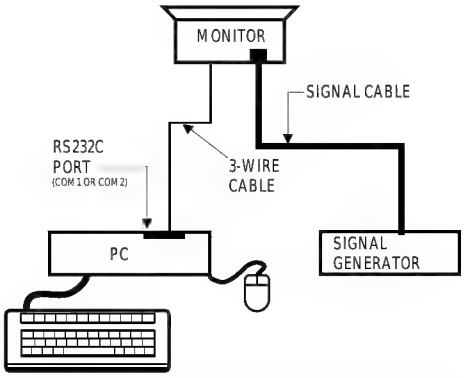


Figure 6-1. Setup 1, With Signal Generator

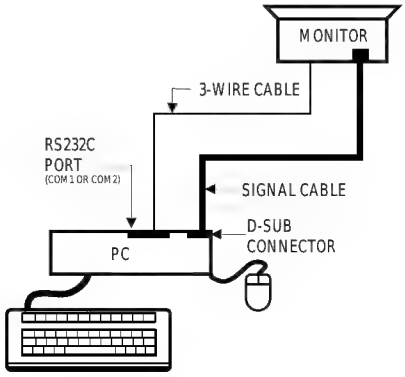


Figure 6-2. Setup 2, Without Signal Generator

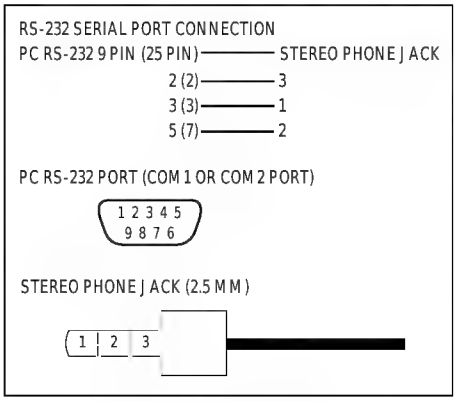


Figure 6-3. 3 Wire Cable

6-1-4 After Making Adjustments

After finishing all adjustments, test the monitor in all directions. If, for example, the monitor does not meet adjustment specifications when facing north, reposition the monitor to face east and readjust. This time, try for an adjustment closer to the ideal setting within the tolerance range. Test the unit again in all directions. If the monitor again fails to meet specifications in every direction, contact your Regional After Service Center for possible CRT replacement.

6-2 Display Control Adjustments

6-2-1 Centering

Centering means to position the center point of the display in the middle of the display area. Horizontal size and position and vertical size and position control the centering of the display.

For each mode, adjust the horizontal size and vertical size to their optimal settings:
390 mm (H) x 292.5 mm (V).

Adjust the horizontal position and vertical position to ≤ 5.0 mm of the center point of the screen.

| A-B | ≤ 5.0 mm. | C-D | ≤ 5.0 mm.

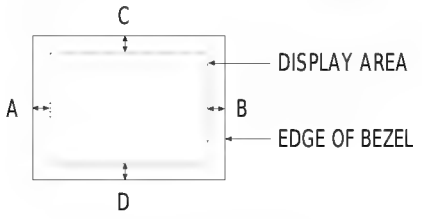


Figure 6-4. Centering

6-2-1 (a) HORIZONTAL SIZE ADJUSTMENT

CONDITIONS

Scanning frequency: Adjust for each mode listed in Table 3-1.
Display image: Crosshatch pattern

Adjust the **H SIZE** setting of the display pattern to 390 mm. (Tolerance: ± 3 mm.)

6-2-1 (b) VERTICAL SIZE ADJUSTMENT

CONDITIONS

Scanning frequency: Adjust for each mode listed in Table 3-1.
Display image: Crosshatch pattern

Adjust the **V SIZE** setting of the display pattern to 292.5 mm. (Tolerance: ± 3 mm.)

6-2-1 (c) HORIZONTAL POSITION ADJUSTMENT

CONDITIONS

Scanning frequency: Adjust for each mode listed in Table 3-1.
Display image: Crosshatch pattern

Adjust the **H POSI** setting to center the horizontal image on the raster.

6-2-1 (d) VERTICAL POSITION ADJUSTMENT

CONDITIONS

Scanning frequency: Adjust for each mode listed in Table 3-1.
Display image: Crosshatch pattern

Adjust the **V POSI** setting to center the vertical image on the raster.

6-2-2 Trapezoid Adjustment

CONDITIONS

Scanning frequency: Adjust for each mode listed in Table 3-1.
Display image: Crosshatch pattern

Adjust the **TRAP** setting to make the image area rectangular.

| A - B | < 2.5 mm

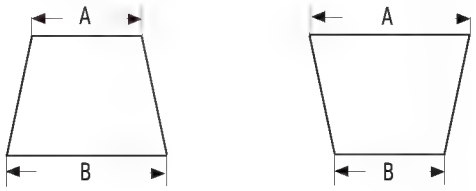


Figure 6-5. Trapezoid

6-2-3 Pinbalance Adjustment

CONDITIONS

Scanning frequency: Adjust for each mode listed in Table 3-1.
Display image: Crosshatch pattern

| D1 |, | D2 | ≤ 1.0 mm

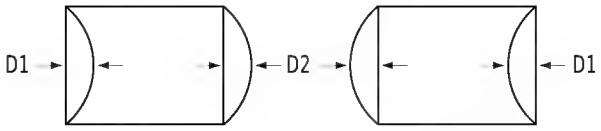


Figure 6-6. Pinbalance

Adjust the **PINBAL** setting to optimize the image.

6-2-4 Parallelogram Adjustment

CONDITIONS

Scanning Frequency: Adjust for each mode listed in Table 3-1.
Display image: Crosshatch pattern

Adjust the **PARA** setting to make the image area rectangular.

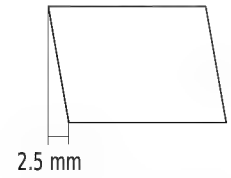


Figure 6-7. Parallelogram

6-2-5 Side Pincushion Adjustment

CONDITIONS

Scanning frequency: Adjust for each mode listed in Table 3-1.
Display image: Crosshatch pattern
Brightness: Cut-off
Contrast: Maximum

Adjust the **PIN** setting to straighten the sides of the image area.

$|C1|, |C2| \leq 2.0$ mm, $|D1|, |D2| \leq 2.0$ mm.

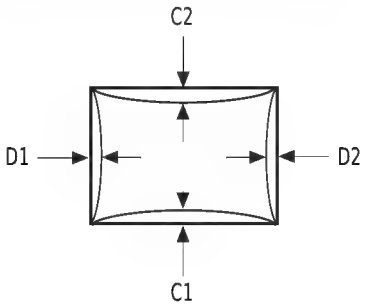


Figure 6-8. Pincushion

6-2-6 Tilt Adjustment

CONDITIONS

Scanning Frequency: Adjust for each mode listed in Table 3-1.
Display image: Crosshatch pattern
Brightness: Cut-off
Contrast: Maximum

Adjust the **TILT** setting to correct the tilt of the display.

6-2-7 Degauss

No adjustments are available for the degaussing circuit. The degaussing circuit can effectively function only once per 30 minutes.

6-2-8 Horizontal Linearity

CONDITIONS

Scanning Frequency: 68 kHz/85 Hz
Display image: Crosshatch pattern

Table 6-1. Linearity Spec.

Mode	Entire	Adjustment
Preset Mode	10 %	4 %
Other Mode	14 %	5 %

Adjust the H_Lin setting to correct the Linearity of the display.

Linearity formula

$$\frac{MAX - MIN}{MAX + MIN} \times 100 = \%$$

6-2-9 Vertical Linearity

Refer to 6-2-8 Horizontal Linearity adjust the V_Lin balance setting to correct the linearity of the display.

6-2-10 Save the Data and Delete the User Mode Data

After adjustment, press Factory Save and Delete the User Mode.

6-3 Color Adjustments

6-3-1 Color Coordinates (Temperature)

Color temperature is a measurement of the radiant energy transmitted by a color. For computer monitors, the color temperature refers to the radiant energy transmitted by white. Color coordinates are the X and Y coordinates on the chromaticity diagram of wavelengths for the visible spectrum.

CONDITIONS

Measurement instrument:	Color analyzer
Scanning frequency:	68 kHz/85 Hz
Display Size :	390 (H) x 292.5 (V)
Display image:	White flat field at center of display area
Brightness:	Cut-off
Contrast:	Maximum

PROCEDURE

Use the directions in sections 6-3-2 through 6-3-4 to adjust the color coordinates for:
9300K to x = 0.283 ± 0.02, y = 0.298 ± 0.02
6500K to x = 0.313 ± 0.02, y = 0.329 ± 0.02
5000K to x = 0.346 ± 0.02, y = 0.359 ± 0.02

6-3-2 Color Adjustments for 9300K

6-3-2 (a) BACK RASTER COLOR ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz
Display image:	Back raster pattern
Brightness:	Cut-off
Contrast:	Maximum

1. Select **COLOR CHANNEL 1** to control the color for 9300K.
2. Adjust the luminance of the back raster to between 0.3 to 1ft-L using the **G_CUT** controls.
3. Click on the << or >> box next to **B_CUT** to set the "y" coordinate to 0.298 ± 0.02.
4. Click on the << or >> box next to **R_CUT** to set the "x" coordinate to 0.283 ± 0.02.

   Note: If the above adjustments cannot be done to each coordinate, click on the << or >> box next to **G_CUT** to decrease or increase the green cutoff (bias) and repeat procedures 2 and 3.

6-3-2 (b) G-GAIN ADJUSTMENT

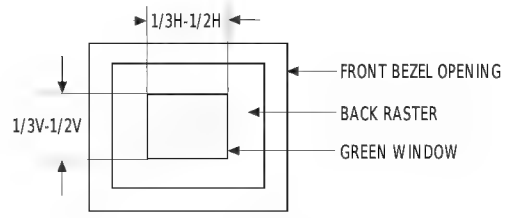


Figure 6-9. Green Box Pattern

CONDITIONS

Scanning frequency:	68 kHz/85 Hz
Display image:	Green box pattern
Brightness:	Cut-off
Contrast:	Maximum

1. Click on the << or >> box next to **G_GAIN** to adjust the brightness of the Green Gain to 25 ± 1 ft-L.

   Note: If you can't increase the Green Gain to the appropriate value, click on the >> box next to increase the **ABL** point.

6-3-2 (c) WHITE BALANCE ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz
Display image:	Full white pattern
Brightness:	Cut-off
Contrast:	Maximum

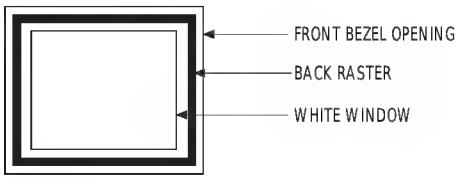


Figure 6-10. Full White Pattern

1. Click on the << or >> boxes next to **R_GAIN** and **B_GAIN** to make the video white. (For 9300K color adjustment: x = 0.283 ± 0.02, y = 0.298 ± 0.02.)

   Note: Do not touch the **G_GAIN** controls.
2. Check the ABL. If it is not within the specifications (30 ± 1 ft-L), use the ABL controls to adjust it.
3. Select **COLOR FACTORY SAVE** to save the data.

6-3-2 (d) WHITE BALANCE ADJUSTMENT VERIFICATION

CONDITIONS

Scanning frequency:	68 kHz/85 Hz
Display image:	Back raster pattern
X-Y Coordinates:	x = 0.283 ± 0.02, y = 0.298 ± 0.02
Raster Luminance	0.3 ~ 1ft-L
ABL Luminance	30 ± 1 ft-L
Brightness:	Cut-off
Contrast:	Maximum

1. Check whether the color coordinates of the back raster satisfy the above spec.

   If they do not, return to 6-3-2 (a) and readjust all settings.
2. Display a full white pattern.

Note: Do not touch the **G_GAIN** controls.

3. Adjust the Contrast Control on the monitor so that the luminance of the video is about 5 ft-L.
4. Check whether the white coordinates of the video meet the above coordinates spec.
5. Adjust the Contrast Control again so that the luminance of the video is about 20 ft-L.
6. Check whether the white coordinates of the video satisfies the above spec.

   If they do not, return to 6-3-2 (a) and readjust all settings.

6-3-3 Color Adjustments for 6500K

6-3-3 (a) BACK RASTER COLOR ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz
Display image:	Back raster pattern
Brightness:	Cut-off
Contrast:	Maximum

1. Select **COLOR CHANNEL 2** to control the color for 6500K.
2. Adjust the luminance of the back raster to between 0.3 to 1.0 ft-L using the **G_CUT** controls.
3. Click on the << or >> boxes next to **R_CUT** and **B_CUT** to adjust the R-Bias to x = 0.313 ± 0.02 and the B-Bias to y = 0.329 ± 0.02.

6-3-3 (b) G-GAIN ADJUSTMENT

This procedure is the same as that for 9300K, refer to the procedure on page 6-5.

6-3-3 (c) WHITE BALANCE ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz
Display image:	Full white pattern
Brightness:	Cut-off
Contrast:	Maximum

1. Click on the << or >> boxes next to **R_GAIN** and **B_GAIN** to make the video white. (For 6500K color adjustment: x = 0.313 ± 0.02, y = 0.329 ± 0.02.)
2. Refer to the procedure for 9300K, section 6-3-2 (c) steps 2 and 3.

6-3-3 (d) WHITE BALANCE ADJUSTMENT VERIFICATION

Refer to the procedure for 9300K, section 6-3-2 (d).

6-3-4 Color Adjustments for 5000K

6-3-4 (a) BACK RASTER COLOR ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz
Display image:	Back raster pattern
Brightness:	Cut-off
Contrast:	Maximum

1. Select **COLOR CHANNEL 3** to control the color for 5000K.
2. Adjust the luminance of the back raster to between 0.3 to 1.0 ft-L using the **G_CUT** controls.
3. Click on the << or >> boxes next to **R_CUT** and **B_CUT** to adjust the R-Bias to x = 0.346 ± 0.02 and the B-Bias to y = 0.359 ± 0.02.

6-3-4 (b) G-GAIN ADJUSTMENT

This procedure is the same as that for 9300K, refer to the procedure on page 6-5.

Adjust the brightness of the **G_GAIN** less 5 ft-L than brightness of procedure for 9300K.

6-3-4 (c) WHITE BALANCE ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz
Display image:	Full white pattern
Brightness:	Cut-off
Contrast:	Maximum

1. Click on the << or >> boxes next to **R_GAIN** and **B_GAIN** to make the video white. (For 5000K color adjustment: x = 0.346 ± 0.02, y = 0.359 ± 0.02.)
2. Refer to the procedure for 9300K, section 6-3-2 (c) steps 2 and 3.

6-3-4 (d) WHITE BALANCE ADJUSTMENT VERIFICATION

Refer to the procedure for 9300K, section 6-3-2 (d).

6-3-5 Luminance Uniformity Check

Luminance is considered uniform only if the ratio of lowest to highest brightness areas on the screen is not less than 7.5:10.

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (1024 x 768)
Display image:	White flat field
Display size	390 (H) x 292.5 (V)
Brightness:	Cut off point
Contrast:	Maximum

PROCEDURE

Measure luminance at nine points on the display screen (see figure below).

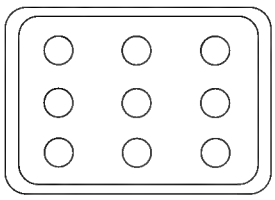


Figure 6-11. Luminance Uniformity Check Locations

6-3-6 Focus Adjustment

CONDITIONS

Scanning frequency:	68 kHz/85 Hz
Display image:	"H" character pattern
Brightness:	Cut off point
Contrast:	Maximum

PROCEDURE

1. Adjust the Focus VR on the FBT to display the sharpest image possible.
2. Use Locktite to seal the Focus VR in position.

6-3-7 Color Purity Adjustment

Color purity is the absence of undesired color. Conspicuous mislanding (unexpected color in a uniform field) within the display area shall not be visible at a distance of 50 cm from the CRT surface.

CONDITIONS

Orientation:	Monitor facing east
Scanning frequency:	Adjust for each mode listed in Table 3-1.
Display image:	White flat field
Luminance:	Cutoff point at the center of the display area

Note: Color purity adjustments should only be attempted by qualified personnel.

PROCEDURE

For trained and experienced service technicians only.

Use the following procedure to correct minor color purity problems:

1. Make sure the display is not affected by external magnetic fields.
2. Very carefully break the glue seal between the 2-pole purity convergence magnets (PCM), the band and the spacer (see Figure 6-13).
3. Make sure the spacing between the PCM assembly and the CRT stem is 29 mm ± 1 mm.
4. Display a green pattern over the entire display area.
5. Adjust the purity magnet rings on the PCM assembly to display a pure green pattern. (Optimum setting: x = 0.295 ± 0.015, y = 0.594 ± 0.015)
6. Repeat steps 4 and 5 using a red pattern and then again using a blue pattern.

Table 6-2. Color Purity Tolerances

Red:	x = 0.640 ± 0.015	y = 0.323 ± 0.015
Green:	x = 0.295 ± 0.015	y = 0.594 ± 0.015
Blue:	x = 0.142 ± 0.015	y = 0.066 ± 0.015

(For 9300K color adjustment: x = 0.283 ± 0.02, y = 0.298 ± 0.02)

7. When you have the PCMs properly adjusted, carefully glue them together to prevent their movement during shipping.

6-4 Convergence Adjustments

Misconvergence occurs when one or more of the electron beams in a multibeam CRT fail to meet the other beams at a specified point.

Table 6-3. Misconvergence Tolerances

Position	Error in mm	CRT Dot Pitch	REMARK
Center (A)	0.3	0.28	All Mode
Edge (B)	0.4	0.28	<1024 x 768
	0.45	0.28	≥ 800 x 600

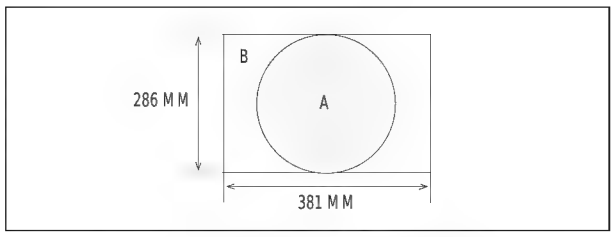
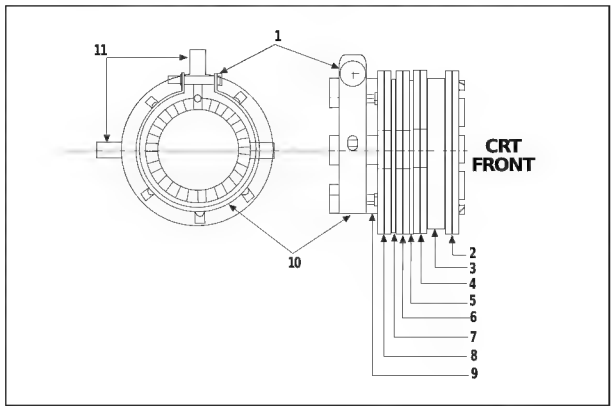


Figure 6-12. Convergence Measurement Areas



Hitachi CRT			
1 Setup Bolt	2 Bow Magnet	3 Band	4 2-Pole Magnet
5 Spacer	6 4-Pole Magnet	7 Spacer	8 6-Pole Magnet
9 Holder	10 Band	11 Tabs	

Figure 6-13. Hitachi Magnet Configuration

6-4-1 Static (Center) Convergence

Static convergence involves alignment of the red, blue and green lines in the center area of the display. See "Dynamic Convergence" for alignment of the color fields around the edges of the display.

CONDITIONS

Orientation: Monitor facing east
Warm-up: 30 minutes
Display image: Crosshatch pattern
Tolerances: See Table 6-3

PROCEDURE

As shown in Figure 6-12, the CRT used in these monitors has the same magnet configuration as shown in Table 6-3 below.

Table 6-4. Magnet Order

CRT Manufacturer	Magnet Order from Front of CRT
Hitachi	Convergence bow, 2-pole, 4-pole, 6-pole

Use the following steps to correct any static misconvergence:

1. Make sure the display is not affected by external magnetic fields.
2. Locate the pair of 4-pole magnet rings.
3. Unlock the rings and rotate the individual rings (change the spacing between tabs) to converge the vertical red and blue lines.
4. Rotate the pair of rings (maintaining the spacing between tabs) to converge the horizontal red and blue lines.

5. After completing the red and blue center convergence adjustment, locate the pair of 6-pole magnet rings.
6. Rotate the individual rings (change the spacing between tabs) to converge the vertical red and blue (magenta) and green lines.
7. Rotate the pair of rings (maintaining the spacing between tabs) to converge the horizontal red and blue (magenta) and green lines. Don't rotate the 2-pole magnets as they adjust for color purity.
8. Mark the correct position for the magnets and apply a small line of glue to hold the magnets in place. Lock the rings in place.

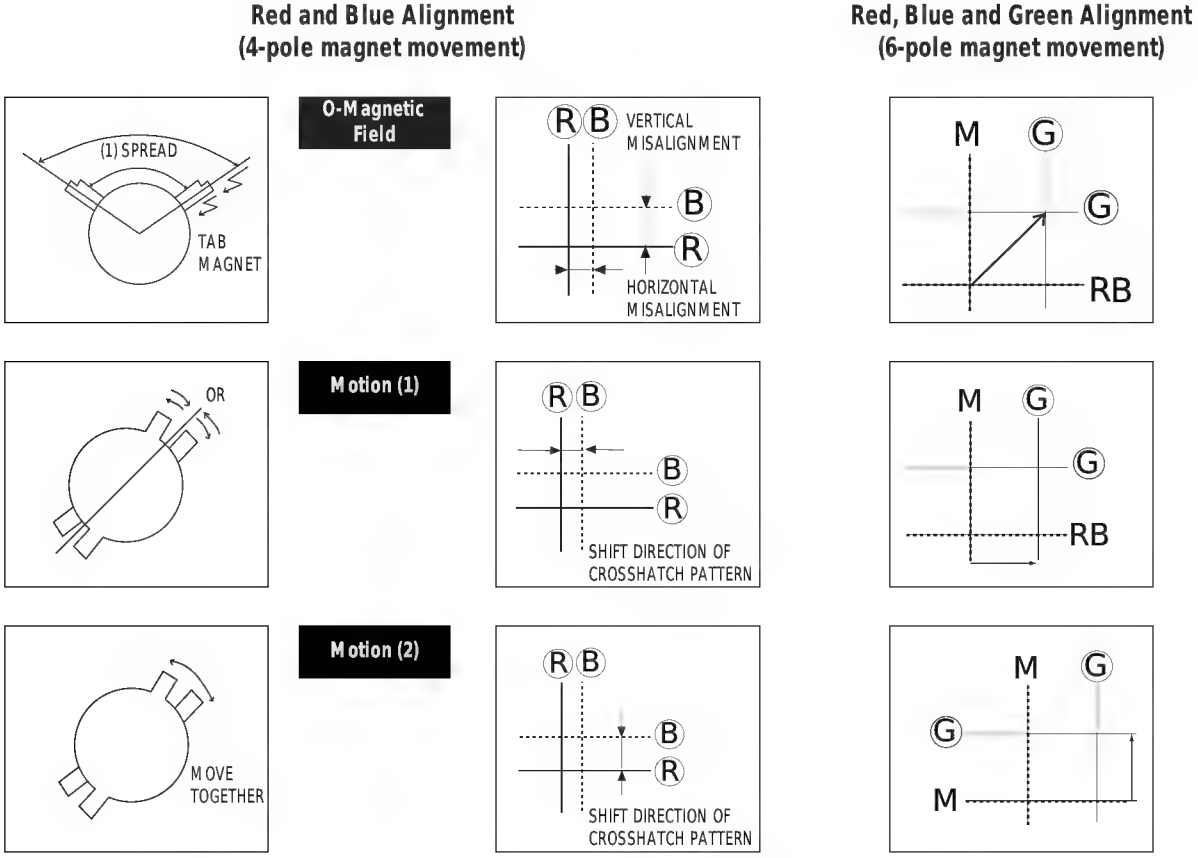
6-4-2 Dynamic (Edge) Convergence

Use the following procedure to correct minor dynamic (edge) misconvergence. If, after using this procedure, dynamic misconvergence around the periphery of the display area is still greater than the tolerance, contact the Regional After Service Center for possible CRT replacement.

1. Make sure the display is not affected by external magnetic fields.
2. Make sure the static convergence is properly adjusted.
3. Strategically place small rubber magnets on the back of the CRT to correct the misconvergence. Be careful not to remove the paper protecting the adhesive on the magnets until you are satisfied with their placement and the dynamic convergence.
4. When you are satisfied with the convergence around the edge of the CRT, permanently glue the magnets to the back of the CRT.

WARNING: Do not remove or change the position of the factory installed wedges. These wedges were installed by the CRT manufacturer and are properly placed for this CRT; their removal may result in damage to the CRT.

Figure 6-14. Magnet Movements



6-4-3 Bow Convergence Adjustments

CONDITIONS

Orientation: Monitor facing east.
Display Image: Crosshatch pattern with mixed RGB colors.
Required tools: Flathead (–) screwdriver, 1.5 mm
Philips (+) screwdriver, 1.5 mm
Hexkey, 2.5 mm

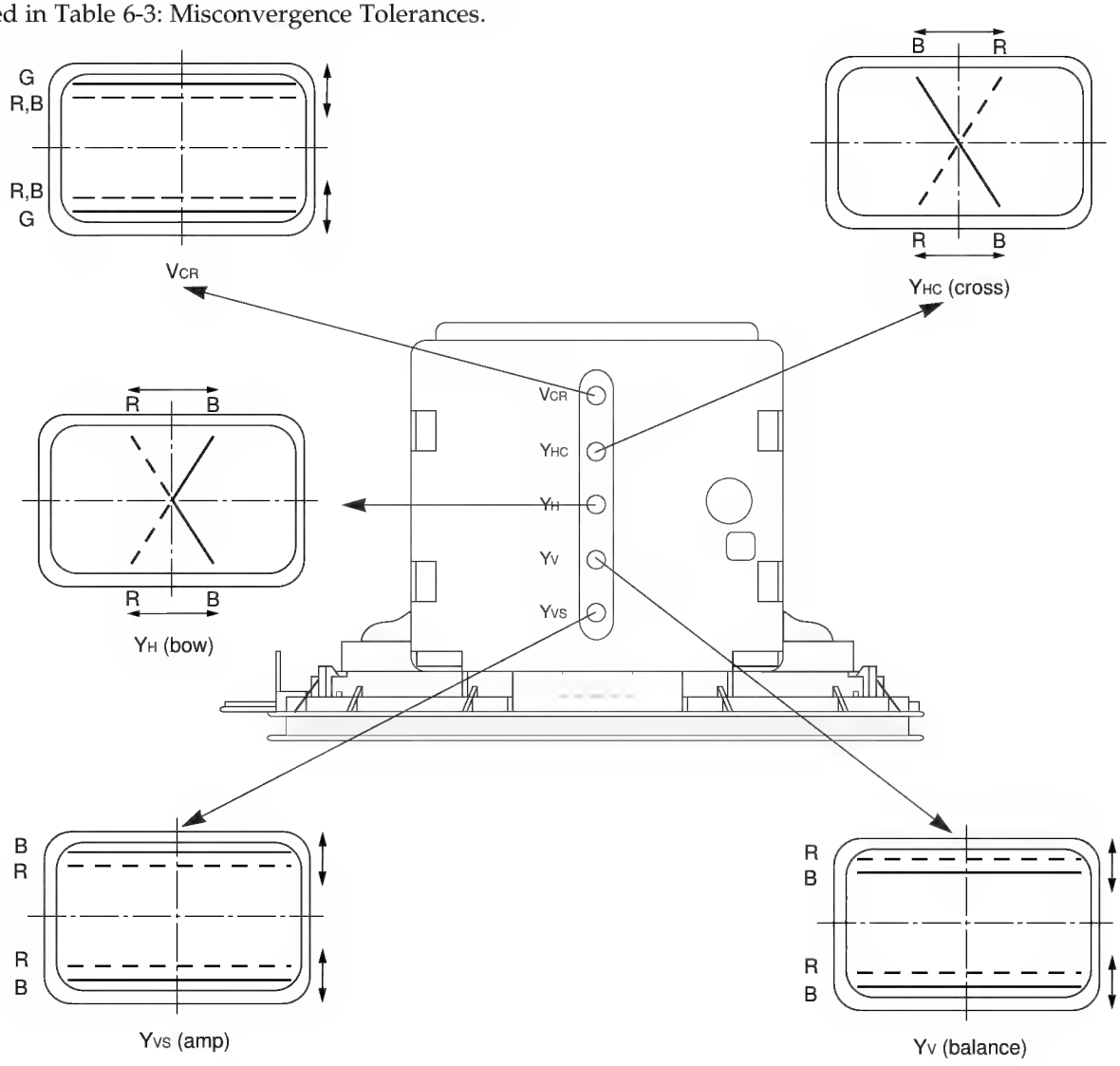
PROCEDURE

Bow convergence adjustments are not available for the CRTs used in the SyncMaster 1000s (CGP1607L) monitor. While all CRTs have bow convergence magnets, they are sealed in the CRT factory and are not user or service technician adjustable. Do not touch these magnets (see Figure 6-12). If bow convergence adjustment is out of alignment, replace the CRT.

Bow misconvergence should not exceed the values listed in Table 6-3: Misconvergence Tolerances.

6-4-4 Balance Convergence Adjustments

Balance Convergence involves alignment of red and blue lines when they are misaligned at one end more so than at the other end. The Deflection Yoke holds the balance coils which can correct balance misconvergences.



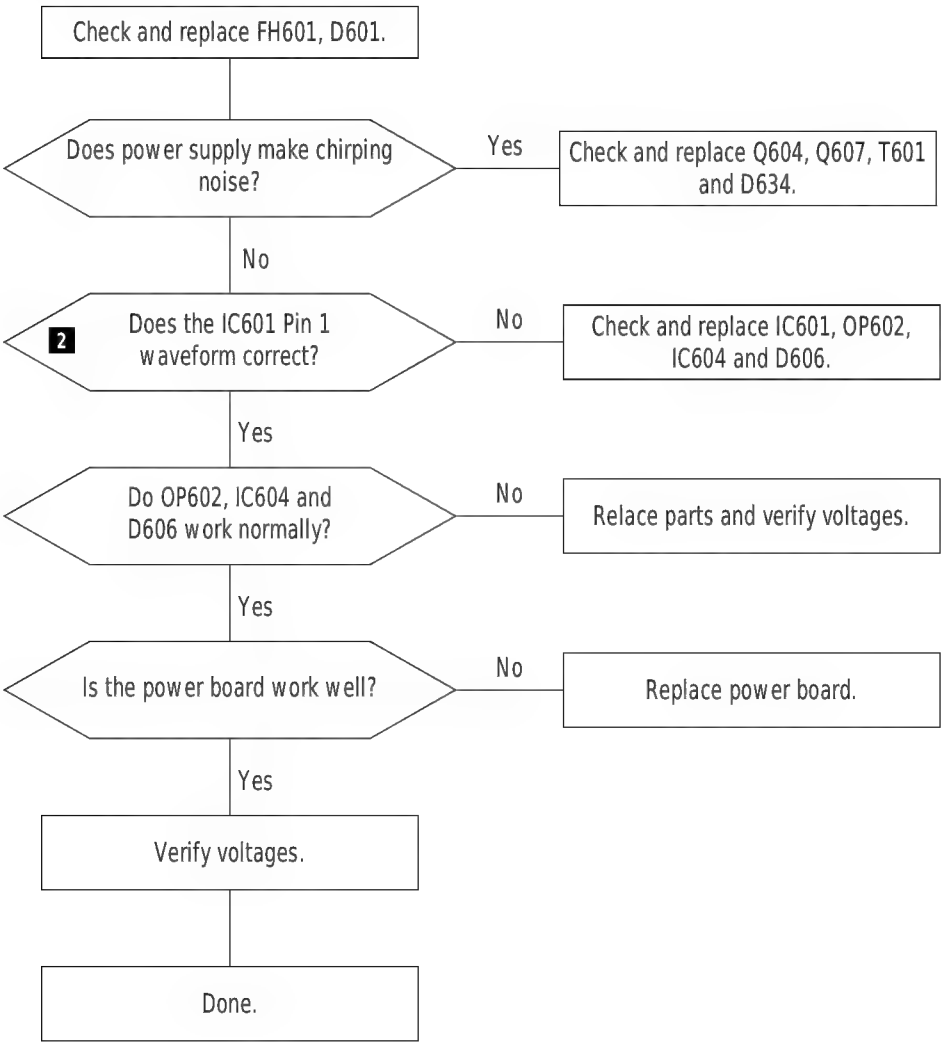
7 Troubleshooting

7-1 Parts Level Board Repair Section

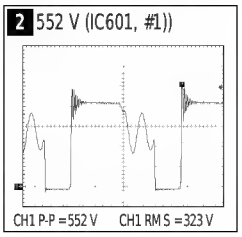
Notes: 1. If a picture does not appear, fully rotate the brightness and contrast controls clockwise and reinspect.

2. Check the following circuits.
   - No raster appears: Power circuit, Horizontal output circuit, H/V control circuit, and H/V output circuit.
   - High voltage develops but no raster appears: Video output circuits.
   - High voltage does not develop: Horizontal output circuits.

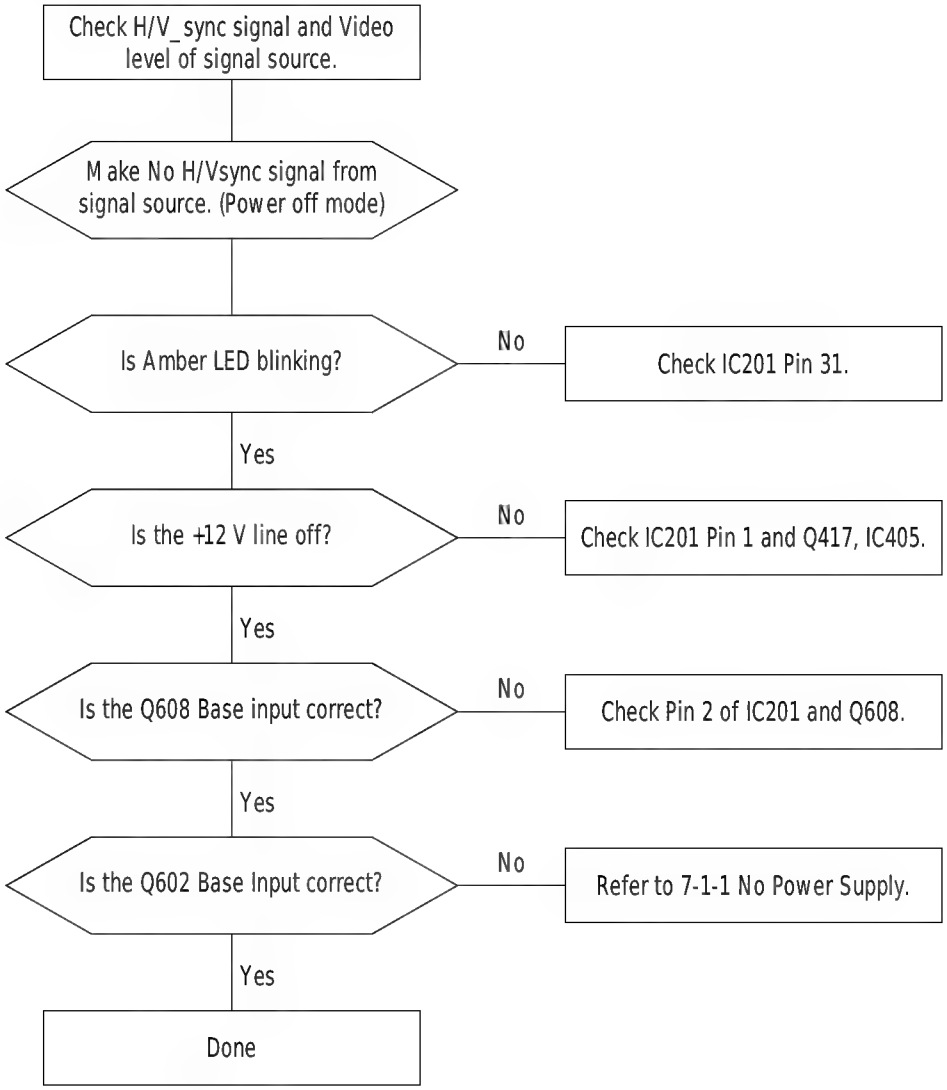
7-1-1 No Power Supply



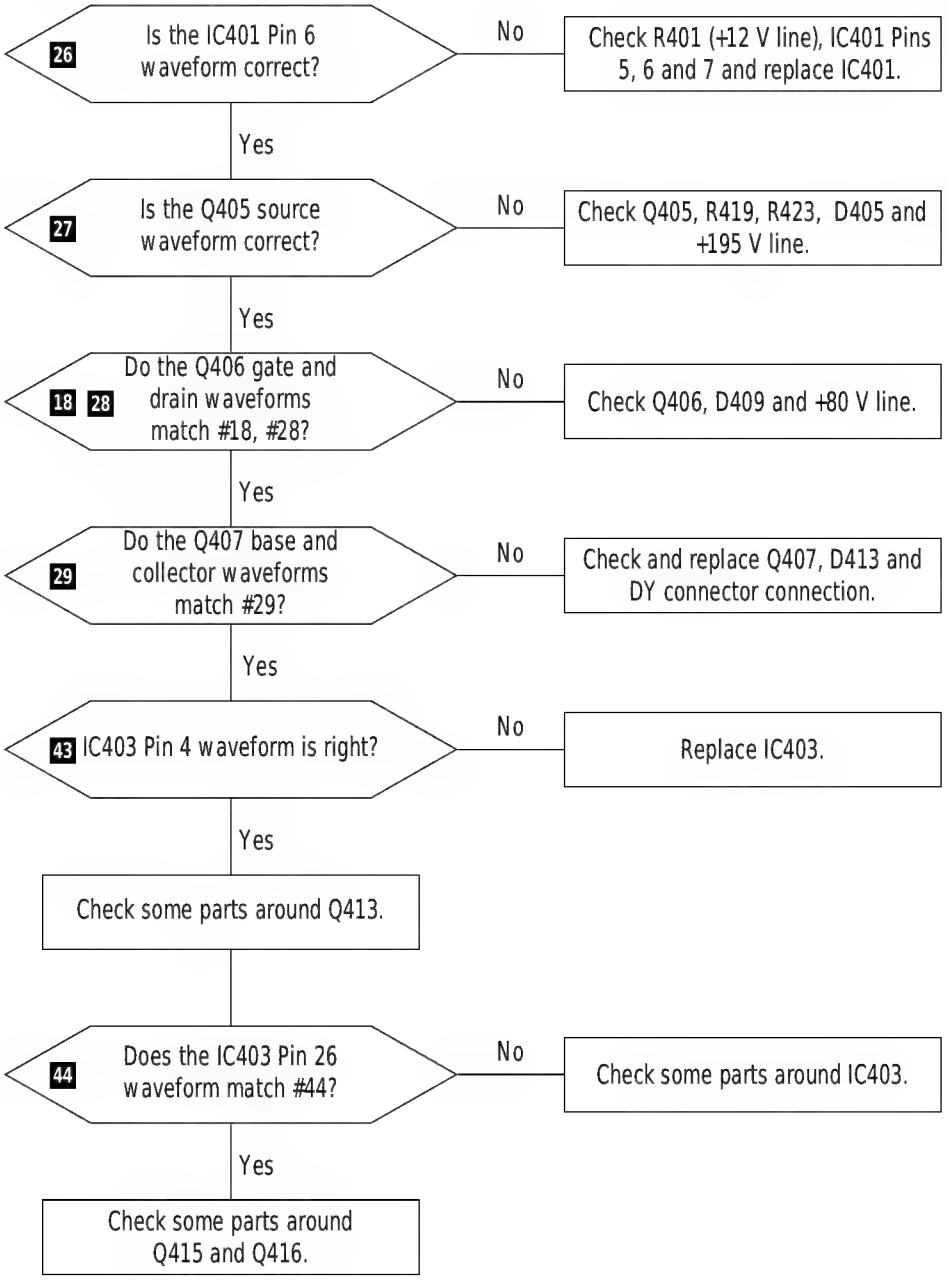
WAVEFORMS



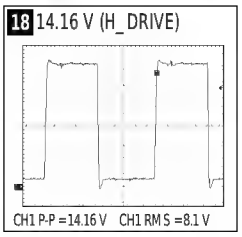
7-1-2 DPMS Failure

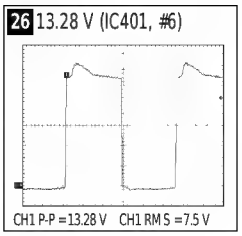


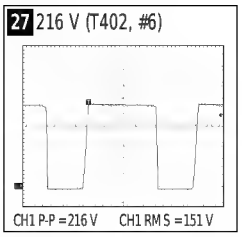
7-1-3 H_Deflection Failure

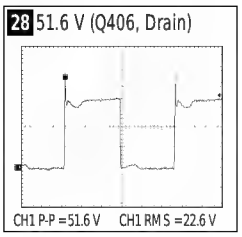

26 Is the IC401 Pin 6 waveform correct?
No
Check R401 (+12 V line), IC401 Pins 5, 6 and 7 and replace IC401.
Yes
27 Is the Q405 source waveform correct?
No
Check Q405, R419, R423, D405 and +195 V line.
Yes
18 28 Do the Q406 gate and drain waveforms match #18, #28?
No
Check Q406, D409 and +80 V line.
Yes
29 Do the Q407 base and collector waveforms match #29?
No
Check and replace Q407, D413 and DY connector connection.
Yes
43 IC403 Pin 4 waveform is right?
No
Replace IC403.
Yes
Check some parts around Q413.
44 Does the IC403 Pin 26 waveform match #44?
No
Check some parts around IC403.
Yes
Check some parts around Q415 and Q416.

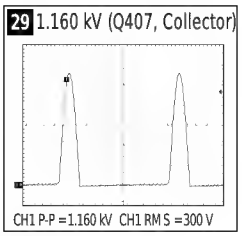
WAVEFORMS

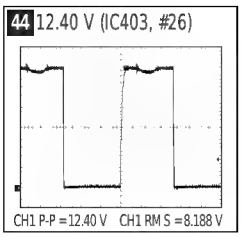


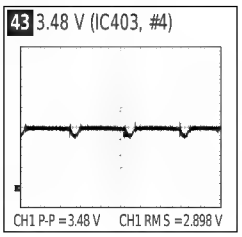




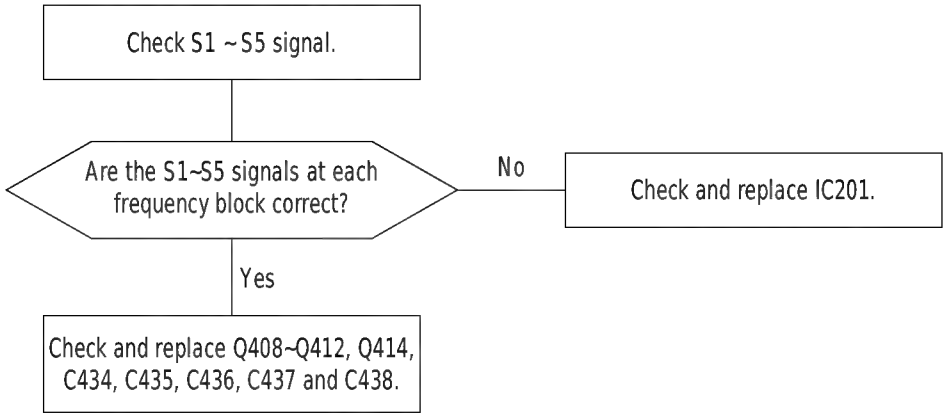




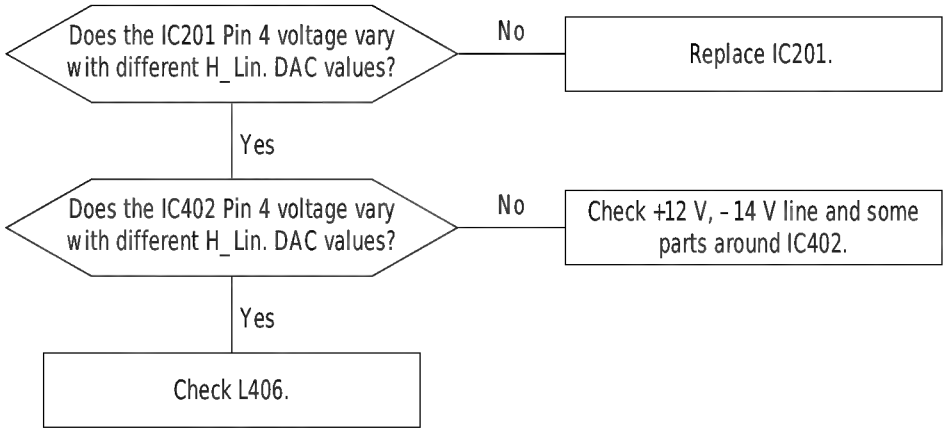




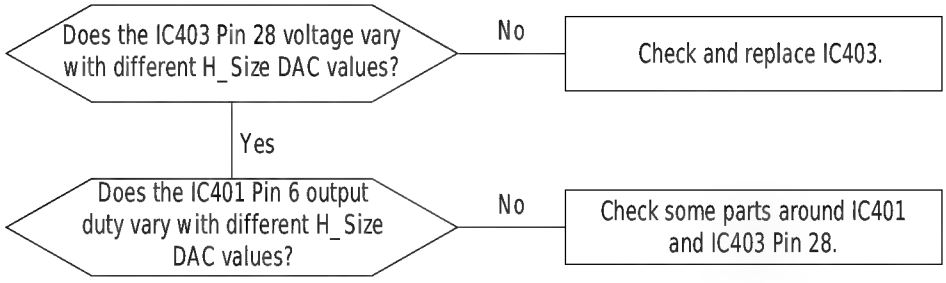
7-1-4 S Correction Failure


Check S1 ~ S5 signal.
Are the S1~S5 signals at each frequency block correct?
No
Check and replace IC201.
Yes
Check and replace Q408~Q412, Q414, C434, C435, C436, C437 and C438.

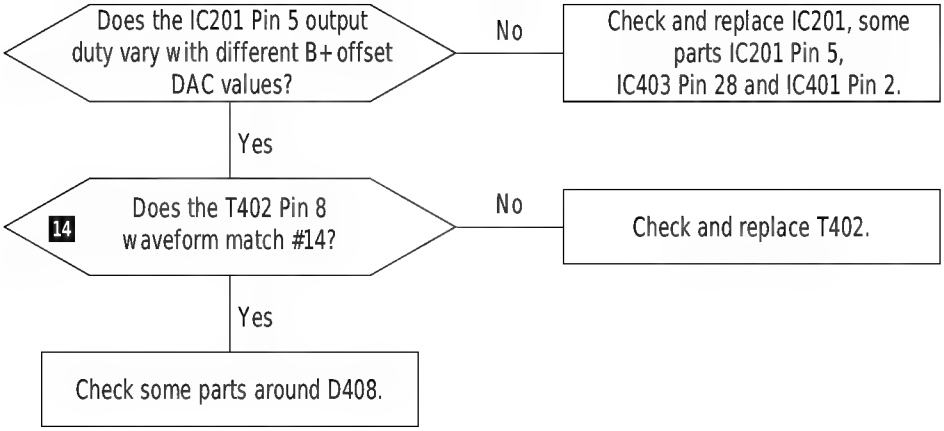
7-1-5 H_Lin. Failure


Does the IC201 Pin 4 voltage vary with different H_Lin. DAC values?
No
Replace IC201.
Yes
Does the IC402 Pin 4 voltage vary with different H_Lin. DAC values?
No
Check +12 V, – 14 V line and some parts around IC402.
Yes
Check L406.

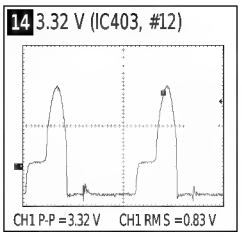
7-1-6 Invariable H_Size


Does the IC403 Pin 28 voltage vary with different H_Size DAC values?
No
Check and replace IC403.
Yes
Does the IC401 Pin 6 output duty vary with different H_Size DAC values?
No
Check some parts around IC401 and IC403 Pin 28.

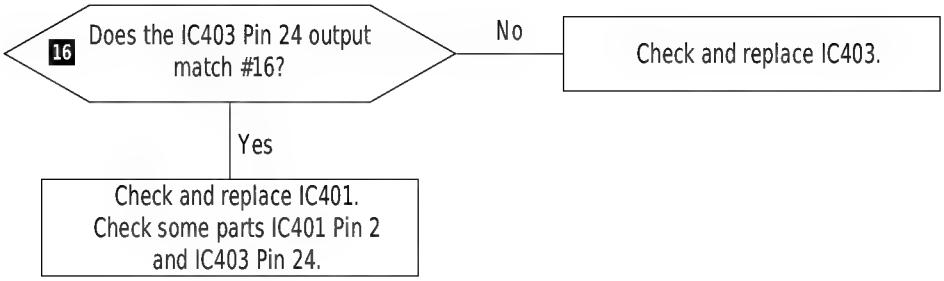
7-1-7 Abnormal H_Size


Does the IC201 Pin 5 output duty vary with different B+ offset DAC values?
No
Check and replace IC201, some parts IC201 Pin 5, IC403 Pin 28 and IC401 Pin 2.
Yes
14
Does the T402 Pin 8 waveform match #14?
No
Check and replace T402.
Yes
Check some parts around D408.

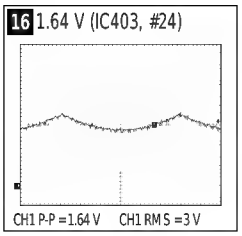
WAVEFORMS



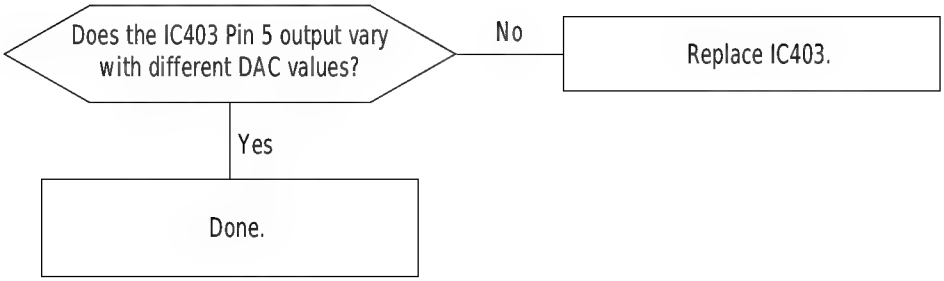
7-1-8 Side Pin or Trap Failure


16
Does the IC403 Pin 24 output match #16?
No
Check and replace IC403.
Yes
Check and replace IC401.
Check some parts IC401 Pin 2 and IC403 Pin 24.

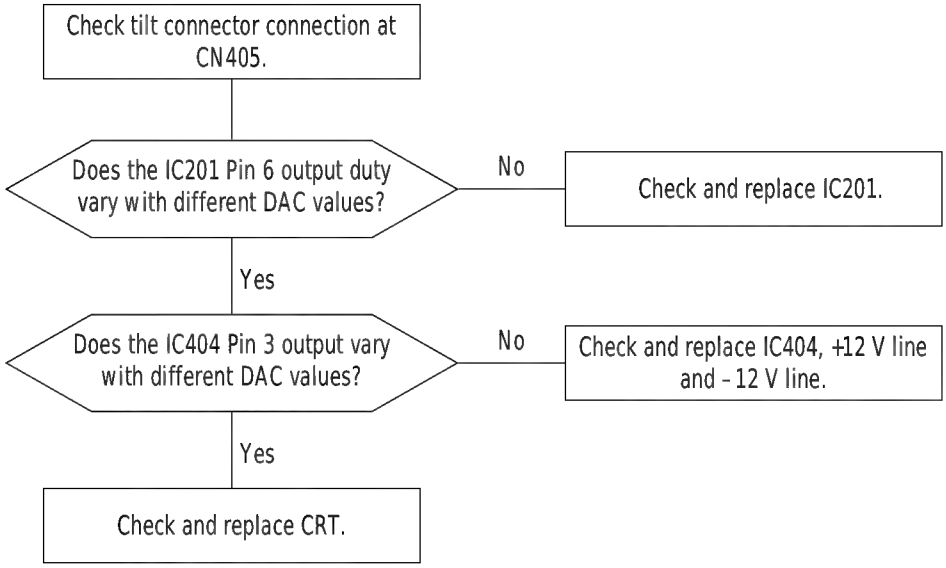
WAVEFORMS



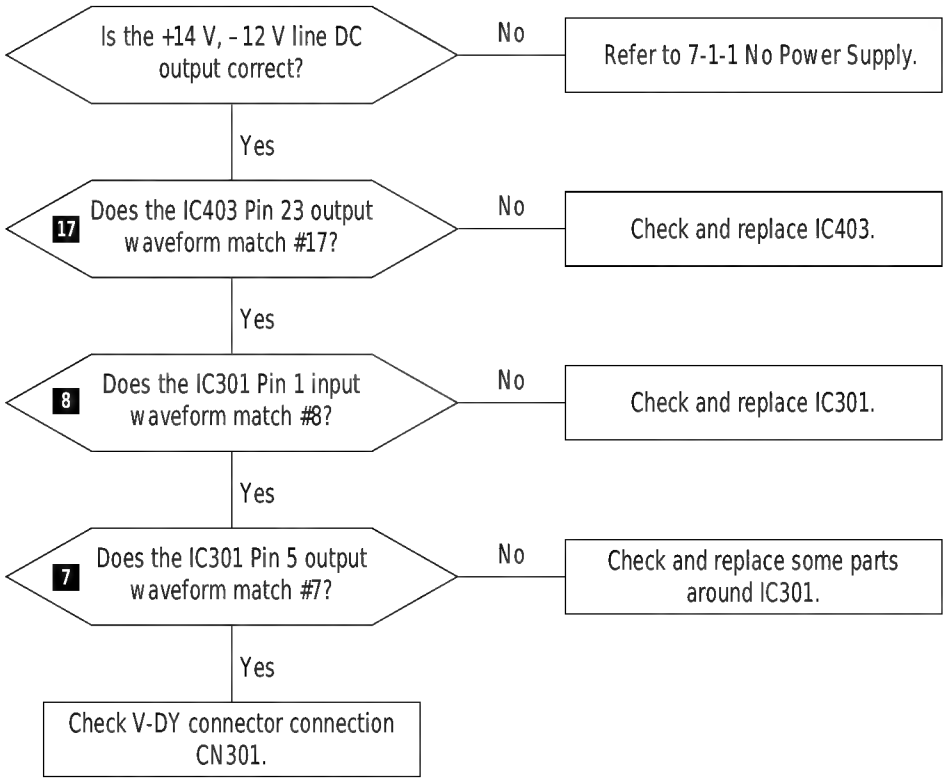
7-1-9 Para. or Pin Balance Failure



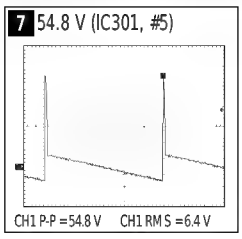
7-1-10 Tilt Failure

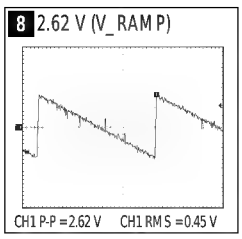

Check tilt connector connection at CN405.
Does the IC201 Pin 6 output duty vary with different DAC values?
No
Check and replace IC201.
Yes
Does the IC404 Pin 3 output vary with different DAC values?
No
Check and replace IC404, +12 V line and – 12 V line.
Yes
Check and replace CRT.

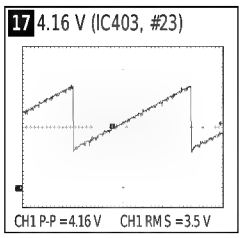
7-1-11 V Deflection Failure


Is the +14 V, – 12 V line DC output correct?
No
Refer to 7-1-1 No Power Supply.
Yes
17 Does the IC403 Pin 23 output waveform match #17?
No
Check and replace IC403.
Yes
8 Does the IC301 Pin 1 input waveform match #8?
No
Check and replace IC301.
Yes
7 Does the IC301 Pin 5 output waveform match #7?
No
Check and replace some parts around IC301.
Yes
Check V-DY connector connection CN301.

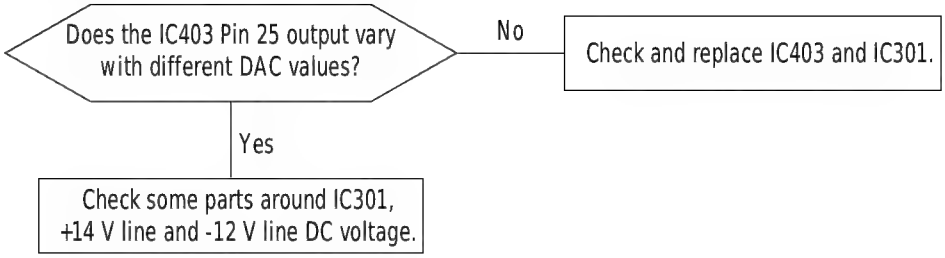
WAVEFORMS



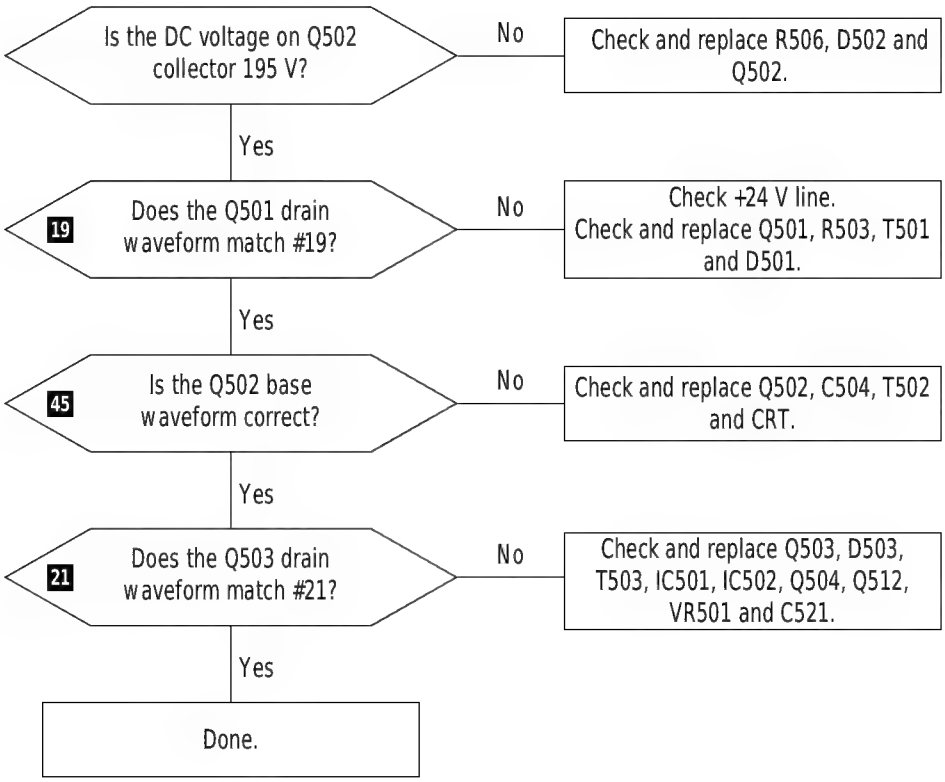




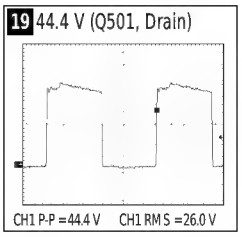
7-1-12 V_Size or V_Posi Variation Failure

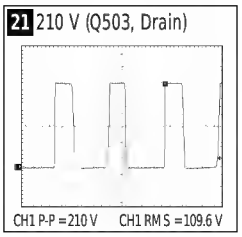

Does the IC403 Pin 25 output vary with different DAC values?
No
Check and replace IC403 and IC301.
Yes
Check some parts around IC301, +14 V line and -12 V line DC voltage.

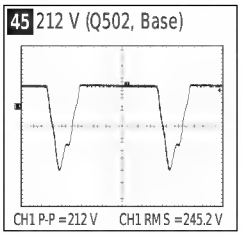
7-1-13 High Voltage Failure


Is the DC voltage on Q502 collector 195 V?
No
Check and replace R506, D502 and Q502.
Yes
19
Does the Q501 drain waveform match #19?
No
Check +24 V line. Check and replace Q501, R503, T501 and D501.
Yes
45
Is the Q502 base waveform correct?
No
Check and replace Q502, C504, T502 and CRT.
Yes
21
Does the Q503 drain waveform match #21?
No
Check and replace Q503, D503, T503, IC501, IC502, Q504, Q512, VR501 and C521.
Yes
Done.

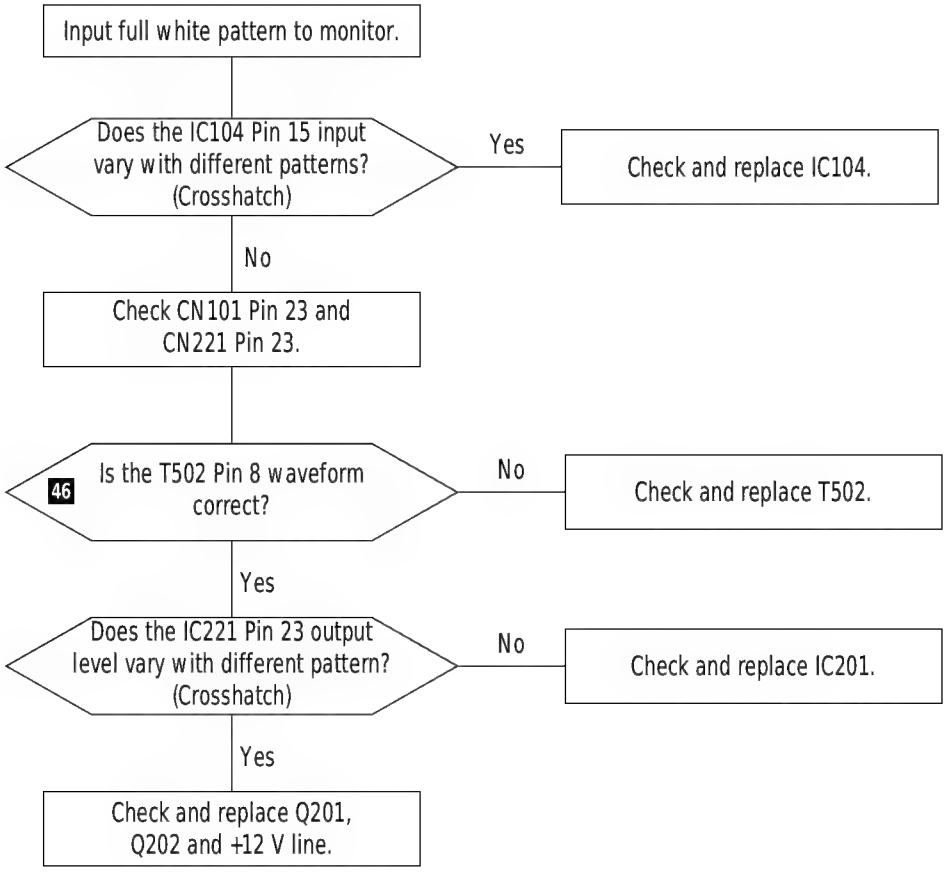
WAVEFORMS



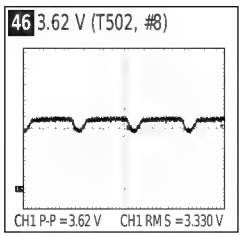




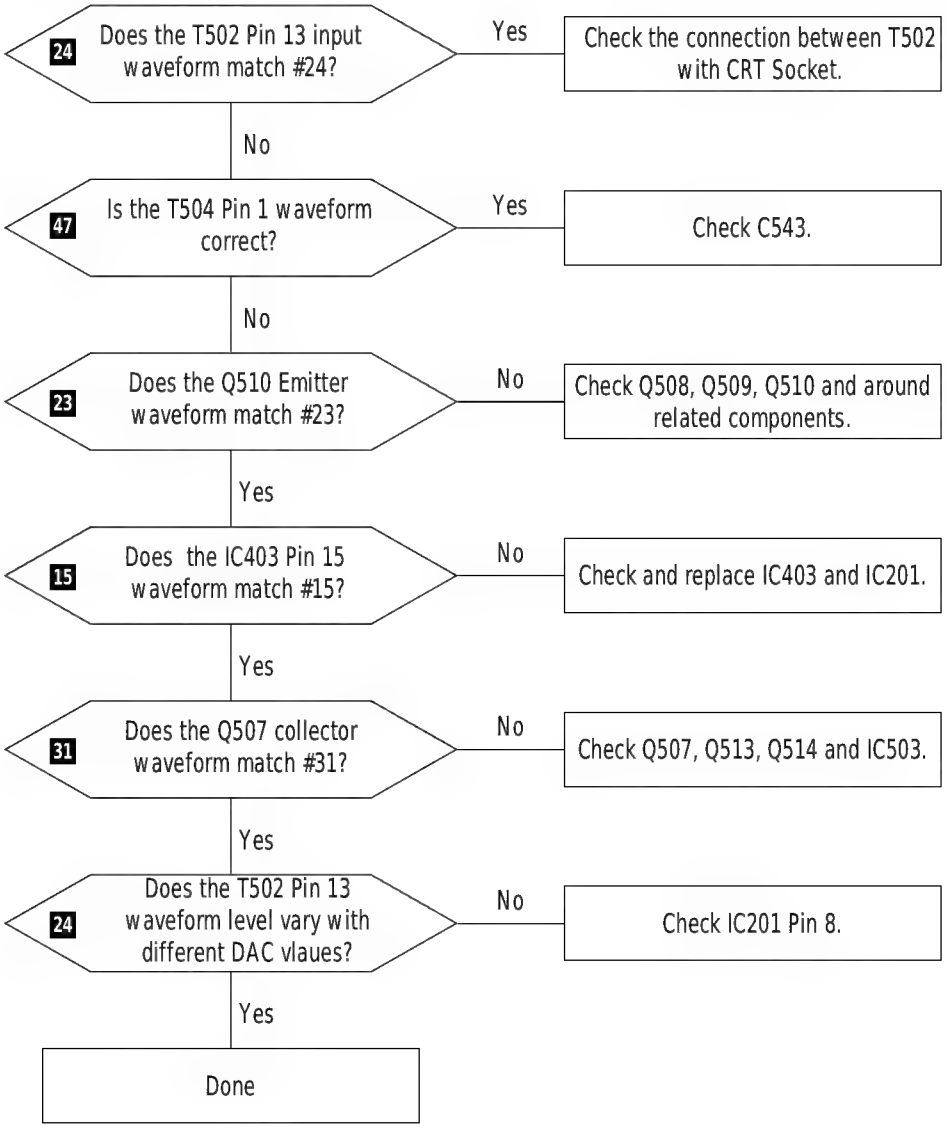
7-1-14 ABL Failure


Input full white pattern to monitor.
Does the IC104 Pin 15 input vary with different patterns? (Crosshatch)
Yes
Check and replace IC104.
No
Check CN101 Pin 23 and CN221 Pin 23.
46
Is the T502 Pin 8 waveform correct?
No
Check and replace T502.
Yes
Does the IC221 Pin 23 output level vary with different pattern? (Crosshatch)
No
Check and replace IC201.
Yes
Check and replace Q201, Q202 and +12 V line.

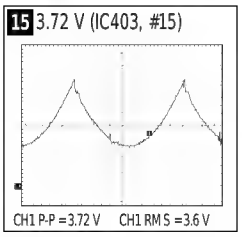
WAVEFORMS

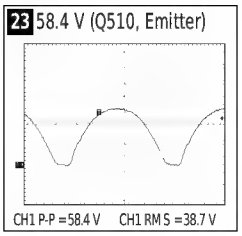


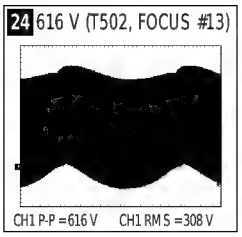
7-1-15 Dynamic Focus Failure

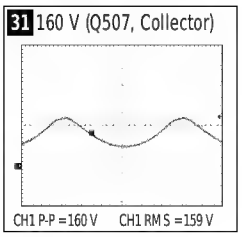

24 Does the T502 Pin 13 input waveform match #24?
Yes
Check the connection between T502 with CRT Socket.
No
47 Is the T504 Pin 1 waveform correct?
Yes
Check C543.
No
23 Does the Q510 Emitter waveform match #23?
No
Check Q508, Q509, Q510 and around related components.
Yes
15 Does the IC403 Pin 15 waveform match #15?
No
Check and replace IC403 and IC201.
Yes
31 Does the Q507 collector waveform match #31?
No
Check Q507, Q513, Q514 and IC503.
Yes
24 Does the T502 Pin 13 waveform level vary with different DAC vlaues?
No
Check IC201 Pin 8.
Yes
Done

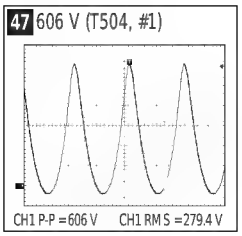
WAVEFORMS



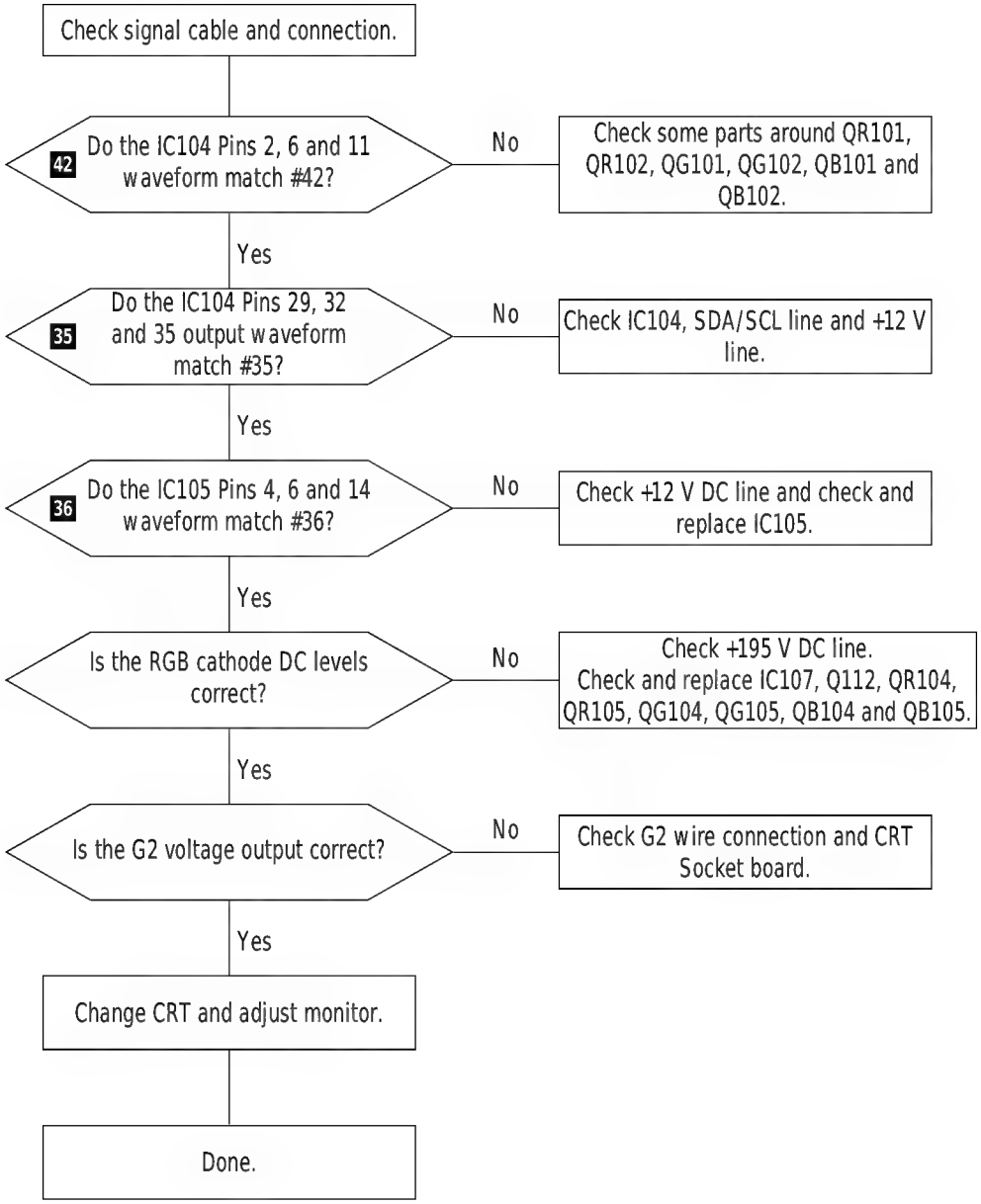






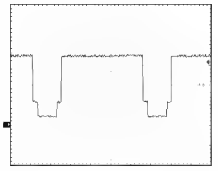


7-1-16 No Video

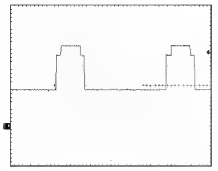

Check signal cable and connection.
42 Do the IC104 Pins 2, 6 and 11 waveform match #42?
No
Check some parts around QR101, QR102, QG101, QG102, QB101 and QB102.
Yes
35 Do the IC104 Pins 29, 32 and 35 output waveform match #35?
No
Check IC104, SDA/SCL line and +12 V line.
Yes
36 Do the IC105 Pins 4, 6 and 14 waveform match #36?
No
Check +12 V DC line and check and replace IC105.
Yes
Is the RGB cathode DC levels correct?
No
Check +195 V DC line. Check and replace IC107, Q112, QR104, QR105, QG104, QG105, QB104 and QB105.
Yes
Is the G2 voltage output correct?
No
Check G2 wire connection and CRT Socket board.
Yes
Change CRT and adjust monitor.
Done.

WAVEFORMS

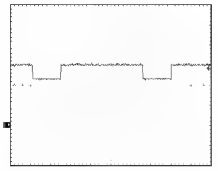
35 3.60 V (IC104, #35)



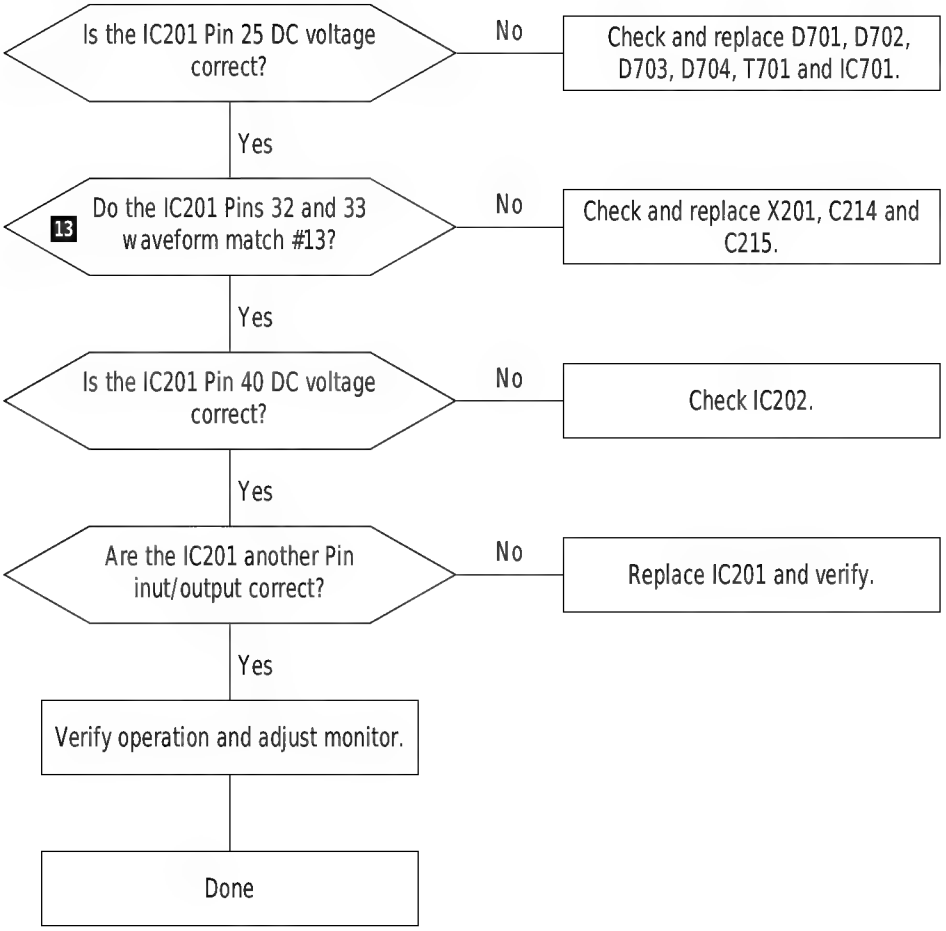
36 47.2 V (IC105, #6)



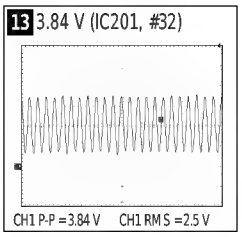
42 1.00 V(IC104, #2)



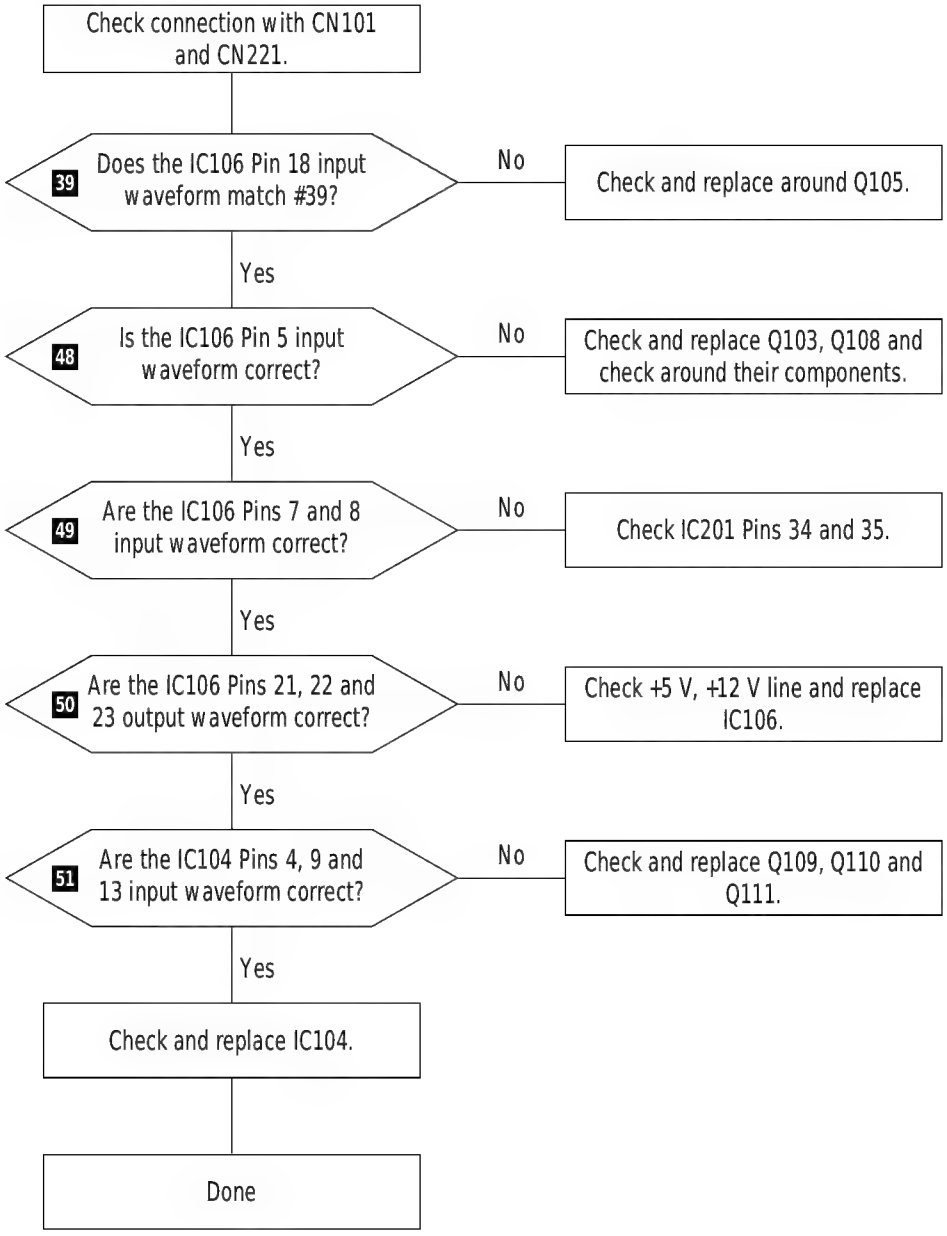
7-1-17 Micom Failure



WAVEFORMS

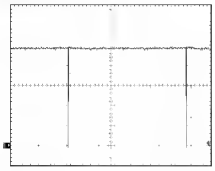


7-1-18 OSD Failure

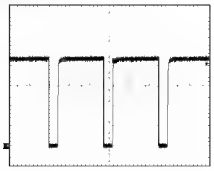

Check connection with CN101 and CN221.
39 Does the IC106 Pin 18 input waveform match #39?
No
Check and replace around Q105.
Yes
48 Is the IC106 Pin 5 input waveform correct?
No
Check and replace Q103, Q108 and check around their components.
Yes
49 Are the IC106 Pins 7 and 8 input waveform correct?
No
Check IC201 Pins 34 and 35.
Yes
50 Are the IC106 Pins 21, 22 and 23 output waveform correct?
No
Check +5 V, +12 V line and replace IC106.
Yes
51 Are the IC104 Pins 4, 9 and 13 input waveform correct?
No
Check and replace Q109, Q110 and Q111.
Yes
Check and replace IC104.
Done

WAVEFORMS

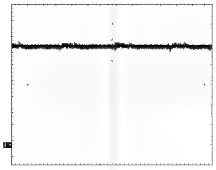
39 5.24 V (IC106, #18)



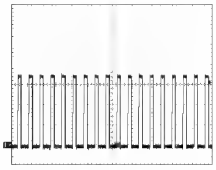
48 4.46 V (IC106, #5)



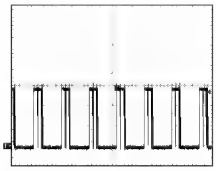
49 5.14 V (IC106, #7, 8)



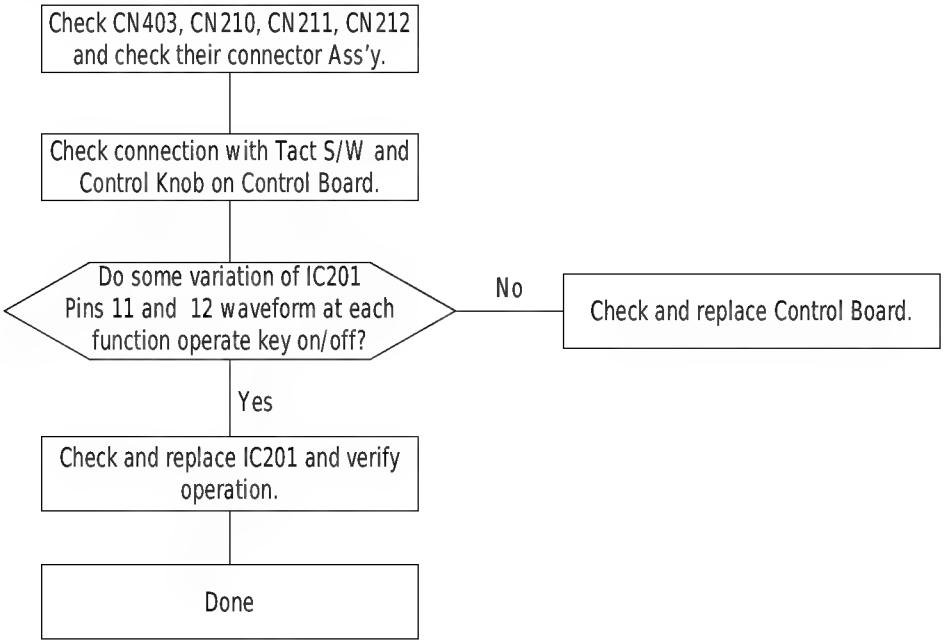
50 3.66 V (IC106, #21)



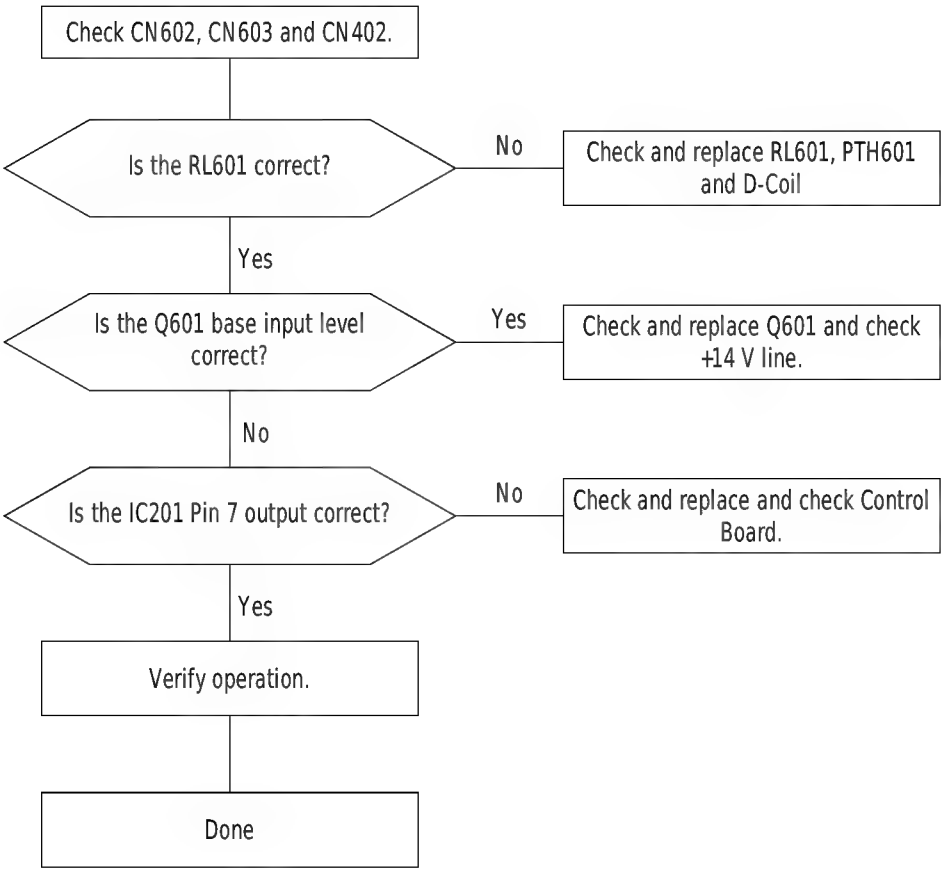
51 3.22 V (IC104, #4)



7-1-19 User Control Failure

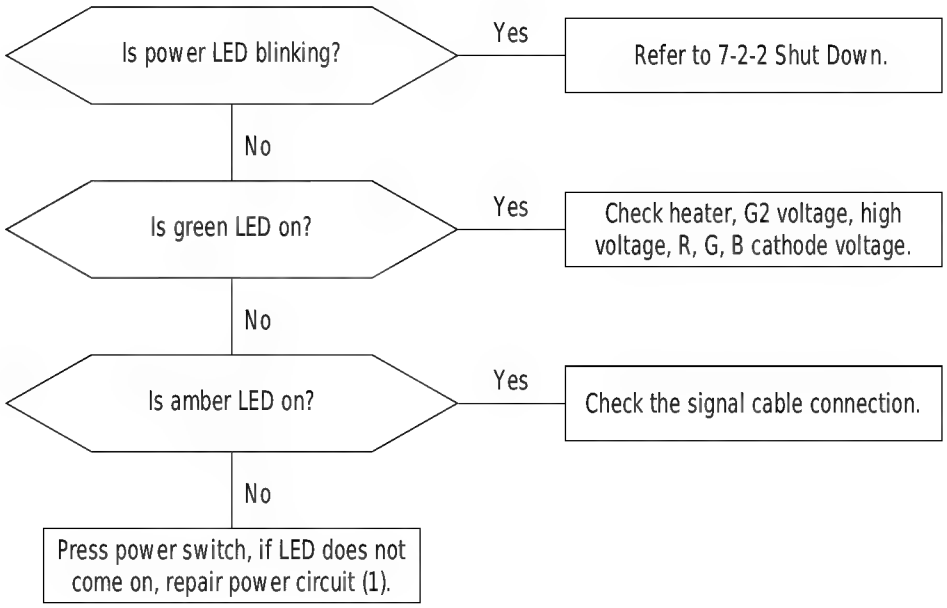

Check CN403, CN210, CN211, CN212 and check their connector Ass'y.
Check connection with Tact S/W and Control Knob on Control Board.
Do some variation of IC201 Pins 11 and 12 waveform at each function operate key on/off?
No
Check and replace Control Board.
Yes
Check and replace IC201 and verify operation.
Done

7-1-20 Degaussing Failure

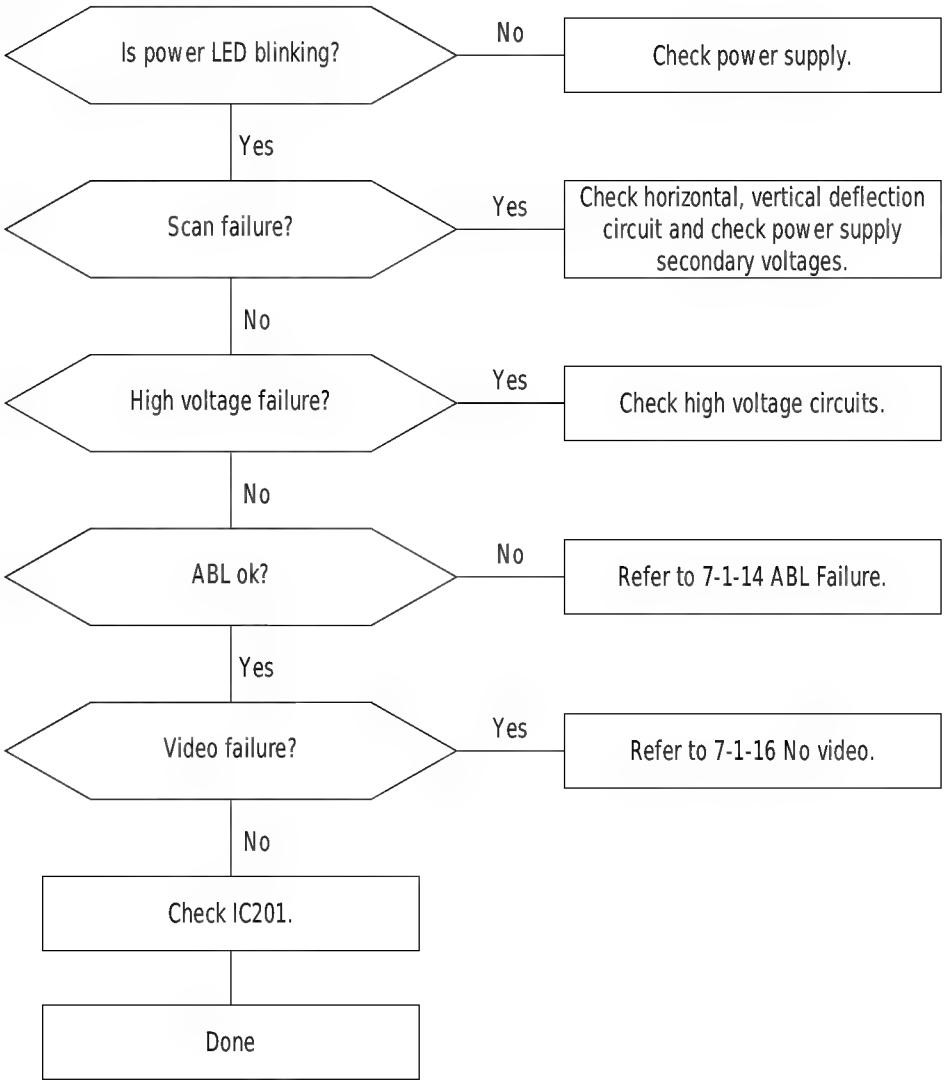


7-2 General Troubleshooting

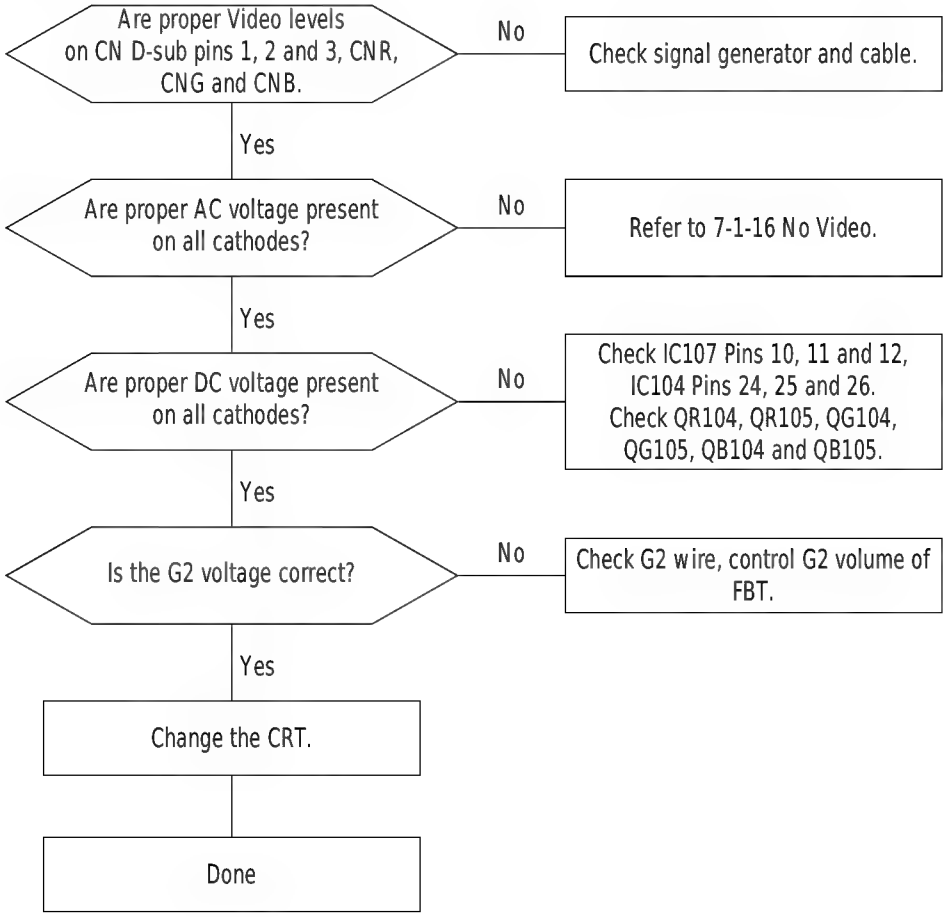
7-2-1 No Picture


Is power LED blinking?
Yes
Refer to 7-2-2 Shut Down.
No
Is green LED on?
Yes
Check heater, G2 voltage, high voltage, R, G, B cathode voltage.
No
Is amber LED on?
Yes
Check the signal cable connection.
No
Press power switch, if LED does not come on, repair power circuit (1).

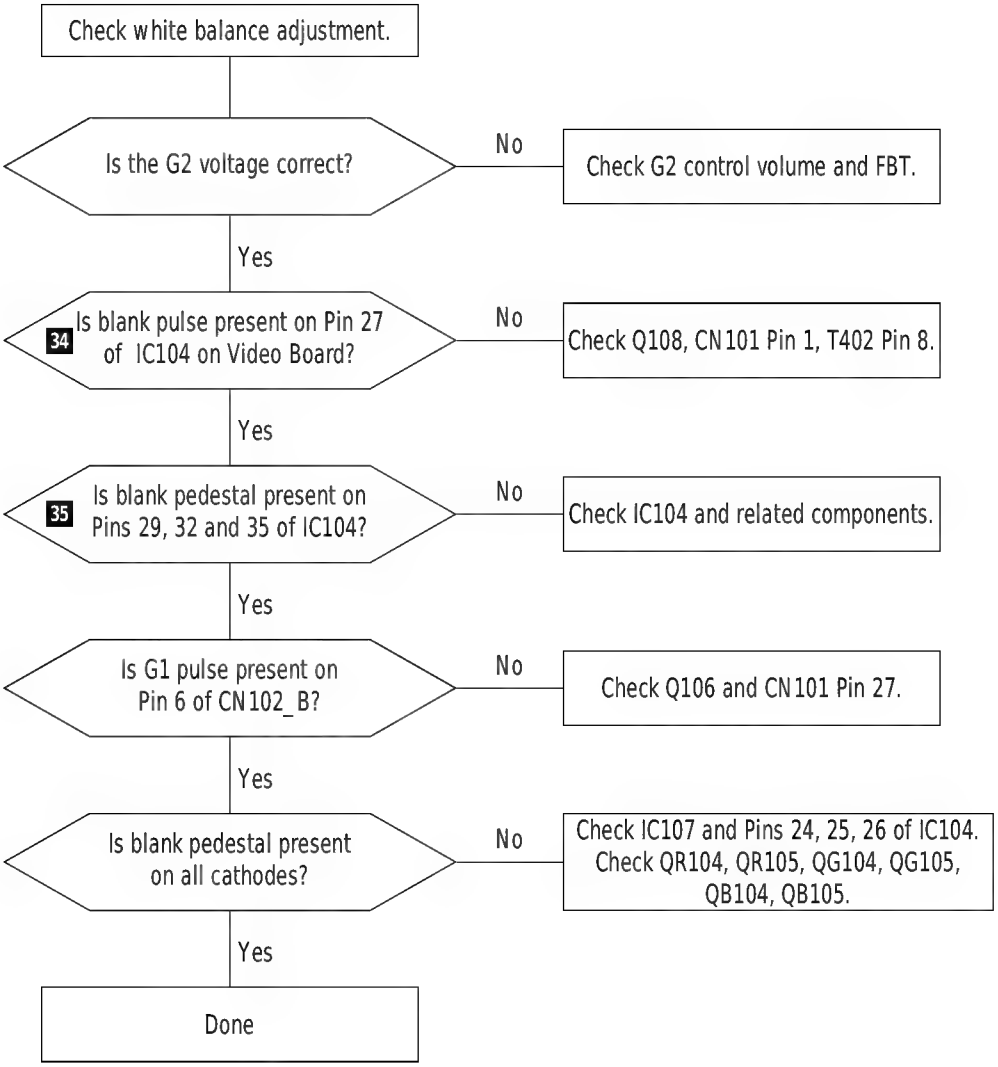
7-2-2 Shut Down



7-2-3 Missing Color

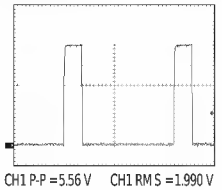

Are proper Video levels on CN D-sub pins 1, 2 and 3, CNR, CNG and CNB.
No
Check signal generator and cable.
Yes
Are proper AC voltage present on all cathodes?
No
Refer to 7-1-16 No Video.
Yes
Are proper DC voltage present on all cathodes?
No
Check IC107 Pins 10, 11 and 12, IC104 Pins 24, 25 and 26. Check QR104, QR105, QG104, QG105, QB104 and QB105.
Yes
Is the G2 voltage correct?
No
Check G2 wire, control G2 volume of FBT.
Yes
Change the CRT.
Done

7-2-4 Visible Retrace

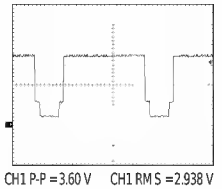

Check white balance adjustment.
Is the G2 voltage correct?
No
Check G2 control volume and FBT.
Yes
34
Is blank pulse present on Pin 27 of IC104 on Video Board?
No
Check Q108, CN101 Pin 1, T402 Pin 8.
Yes
35
Is blank pedestal present on Pins 29, 32 and 35 of IC104?
No
Check IC104 and related components.
Yes
Is G1 pulse present on Pin 6 of CN102_B?
No
Check Q106 and CN101 Pin 27.
Yes
Is blank pedestal present on all cathodes?
No
Check IC107 and Pins 24, 25, 26 of IC104. Check QR104, QR105, QG104, QG105, QB104, QB105.
Yes
Done

WAVEFORMS

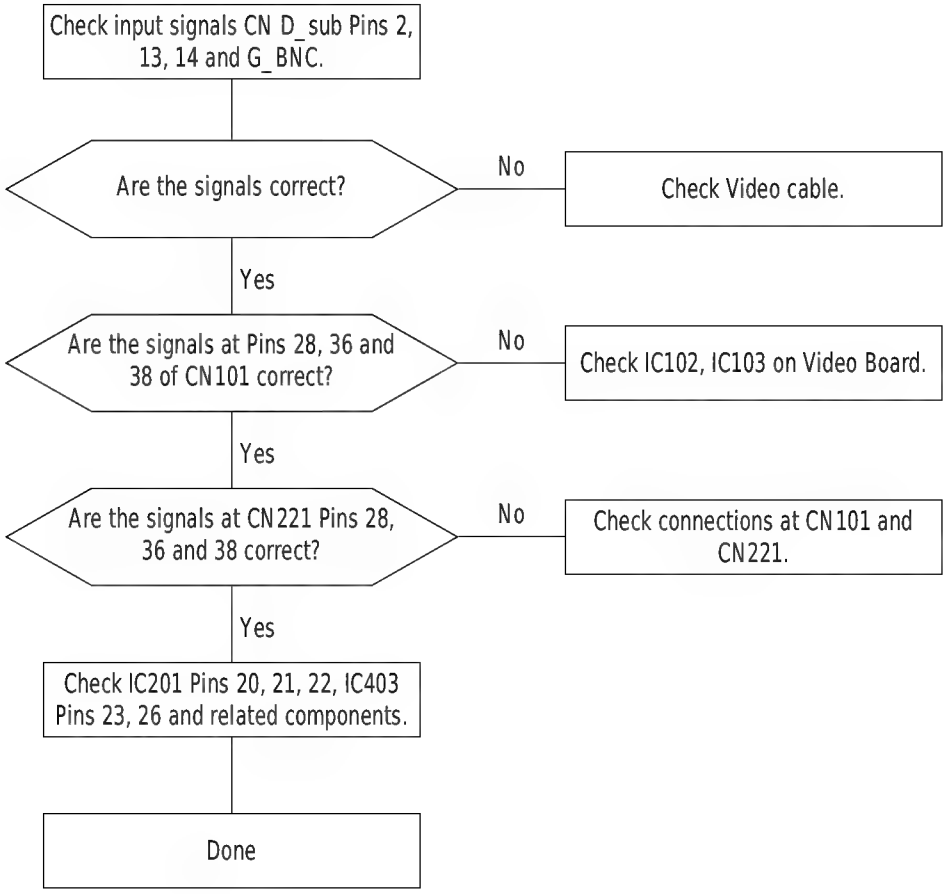
34 5.56 V (IC104, H_BLK)



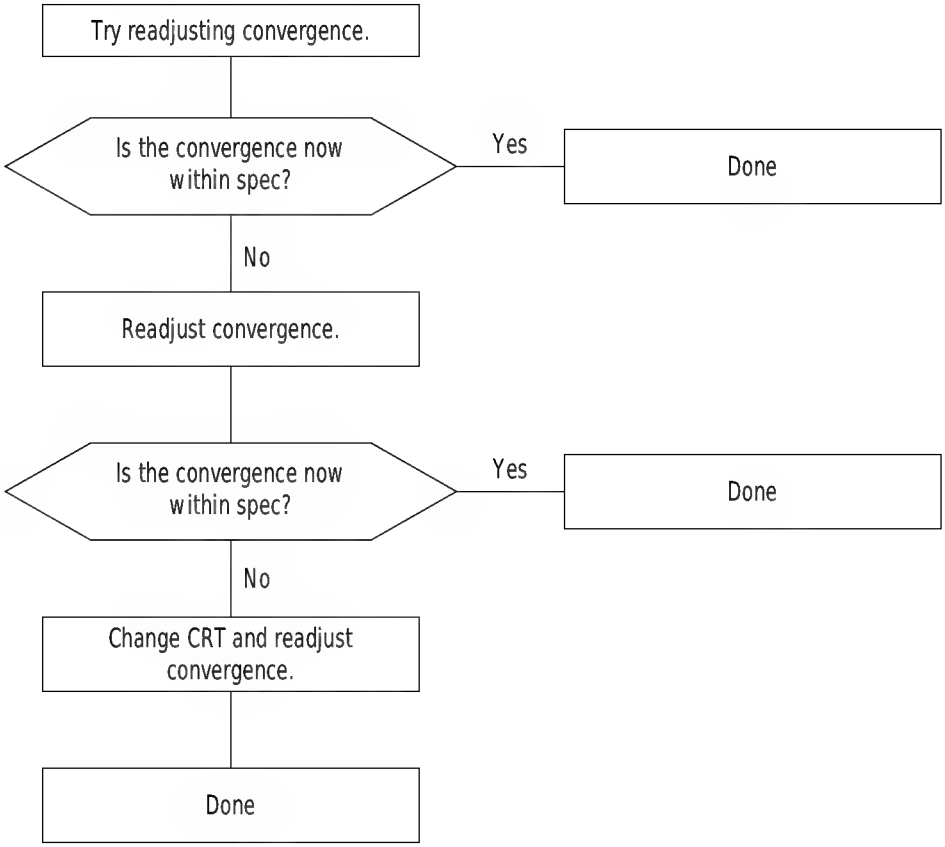
35 3.60 V (IC104, #35)



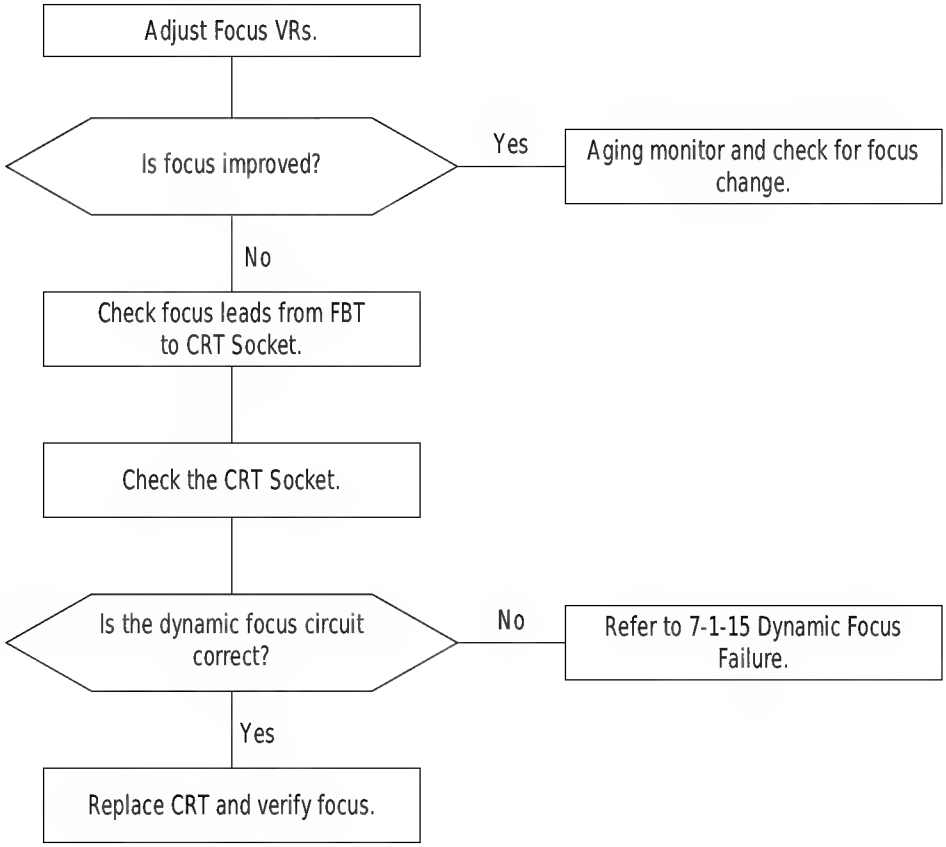
7-2-5 Unsynchronized Image


Check input signals CN D_sub Pins 2, 13, 14 and G_BNC.
Are the signals correct?
No
Check Video cable.
Yes
Are the signals at Pins 28, 36 and 38 of CN101 correct?
No
Check IC102, IC103 on Video Board.
Yes
Are the signals at CN221 Pins 28, 36 and 38 correct?
No
Check connections at CN101 and CN221.
Yes
Check IC201 Pins 20, 21, 22, IC403 Pins 23, 26 and related components.
Done

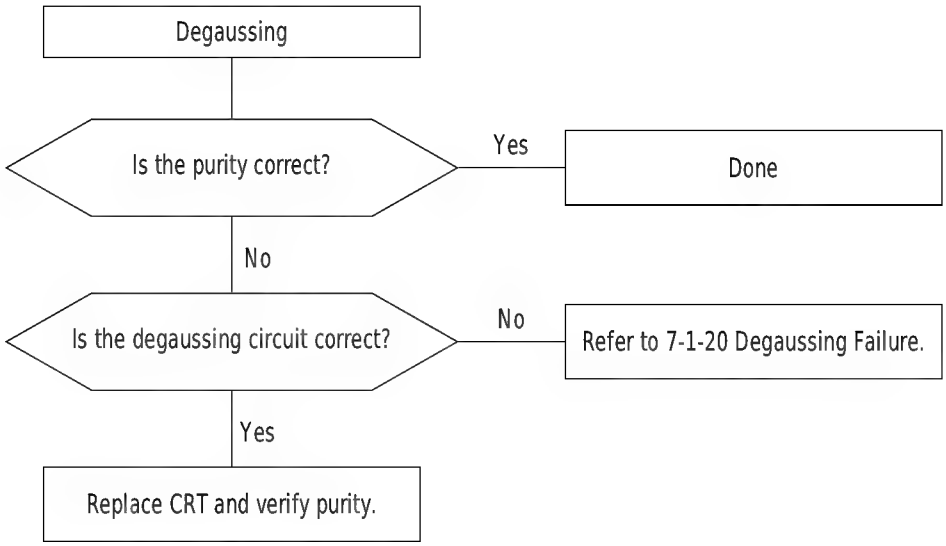
7-2-6 Misconvergence



7-2-7 Poor Focus



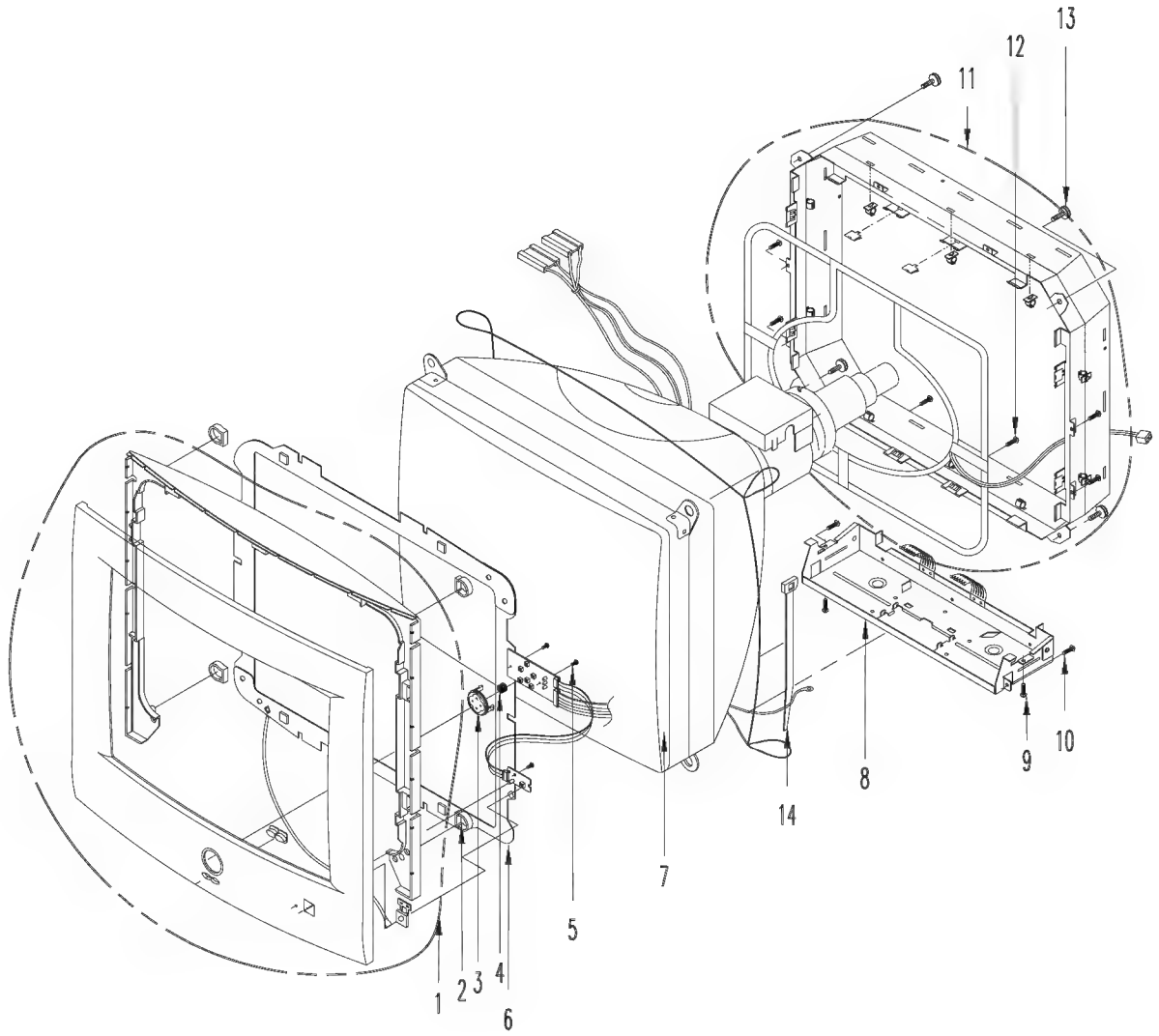
7-2-8 Purity Failure



8 Exploded View and Parts List

8-1 Front Cover & CRT Ass'y

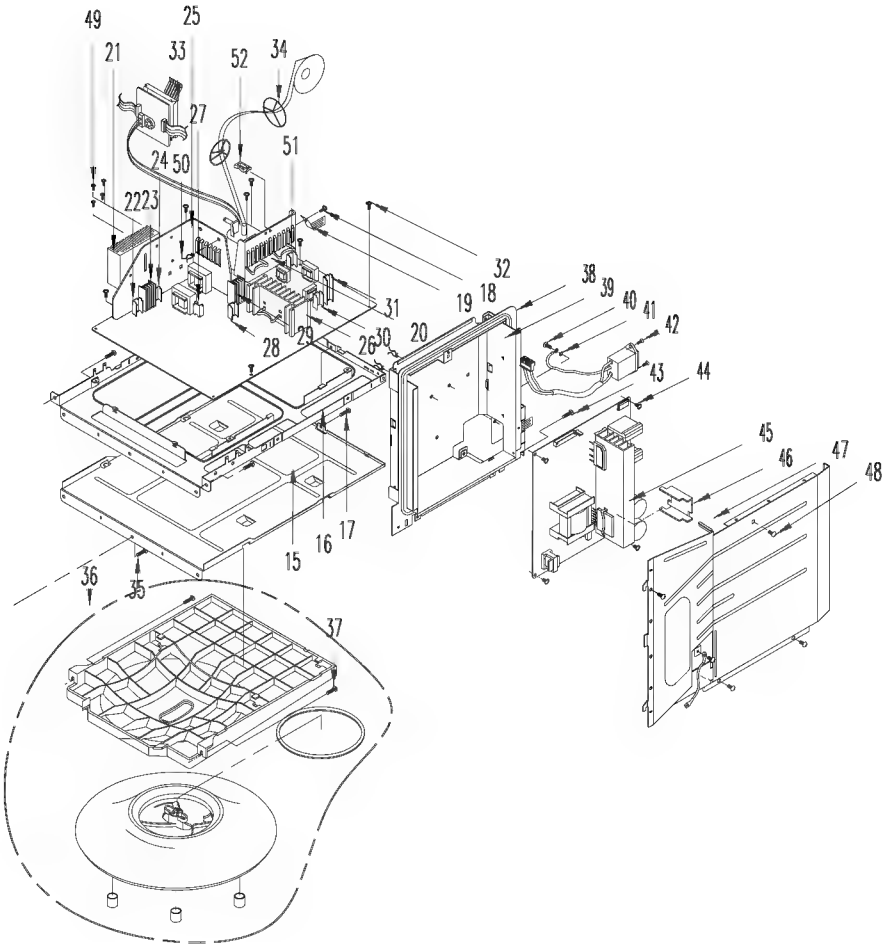
NO	DESCRIPTION	CODE NO.	SPECIFICATION	Q'TY	REMARK
1	UNIT/COVER-FRONT	BH75 10451XHD	ABS HB IV16	1	
2	CAP BOSS	BH72 60491B	PVC-80% GRY	4	
3	KNOB FUNCTION	BH64 10382D	PC+ABS 5V IV16	1	
4	SPRING-CS	6107 001036	T0.5,D10,L15,WHT,STS304WPB	1	
5	SCREW TAPTITE	6003-000015	BH+,BD3,L10,SWRCH18A	3	
6	UNIT/SHIELD FRONT	BH75 10660B	SPTE T0.3	1	
7	21" CDT		CGP1607	1	
8	FRAME-BOTTOM	BH70-10410A	SECC T1.0	1	
9	SCREW TAPTITE	6003 000122	BH+,M4,L12,ZPC(YEL)	2	
10	SCREW TAPTITE	6003-000009	BH+,M4,L16,ZPC(YEL)	2	
11	UNIT/FRAME-CRT	BH75-10460C	SECC T1.0	1	
12	SCREW TAPTITE	6003-000009	BH+,M4,L16,ZPC(YEL)	6	
13	SCREW-ASS'Y TAPTITE	6006 000201	WPP,BH+,M5,L30	4	
14	CABLE-TIE	6501 000001	DA 80,NYLON	1	



8-2 Chassis & Stand Ass'y

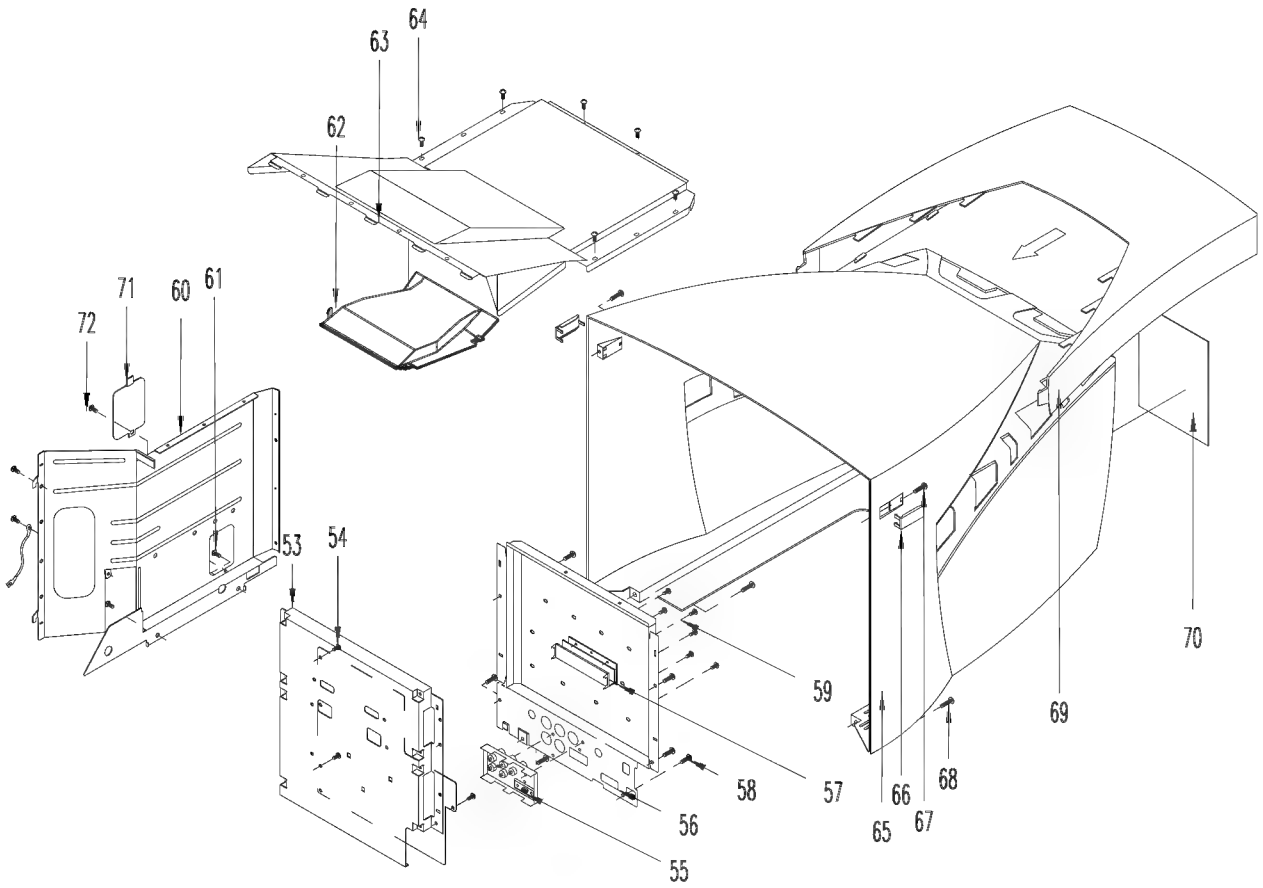
NO.	DESCRIPTION	CODE NO.	SPECIFICATION	Q'TY	REMARK
15	BRKT BOTTOM	BN70-10411A	SECC T1.0	1	
16	BRKT MAIN PCB	BN70-10430A	SECC T1.2	1	
17	SCREW-TAPTITE	6003-000122	BN+,M4,L12,ZPC(YEL)	1	
18	SCREW-TAPTITE	6003-000010	BWN+,B,M3,L10	1	
19	EARTH PLATE	BN71-10365A	PBS3,T0.3	1	
20	ASS'Y HEAT SINK	BN99-10036C	H/S REG,SPR NG,KSC5088,R	1	
21	HEAT SINK-MAIN	BN62-30396A	A6063	1	
22	ASS'Y HEAT SINK	BN99-10010W	H/S TR,SCREW-NUT,RF630A	1	
23	ASS'Y HEAT SINK	BN99-10032E	H/S TR,SCREW,RF640A	1	
24	ASS'Y HEAT SINK	BN99-10010X	H/S TR,SCREW-NUT,RF640A	1	
25	ASS'Y HEAT SINK	BN99-10038A	H/S FBT,SPR NG,M3L16218,M	1	
26	ASS'Y HEAT SINK	BN99-10046C	H/S IC,SPR NG,TDA8172	1	
27	ASS'Y HEAT SINK	BN99-10010V	H/S TR,SCREW-NUT,RF740A	1	
28	ASS'Y HEAT SINK	BN99-10010K	H/S TR,SCREW-NUT,78R12	1	
29	ASS'Y HEAT SINK	BN99-10033B	H/S TR,SCREW,TDA2006	1	
30	ASS'Y HEAT SINK	BN99-10010H	H/S TR,SCREW-NUT,T P30C	1	
31	ASS'Y HEAT SINK	BN99-10021K	H/S TR,SCREW-NUT,T P29C	1	
32	SCREW-TAPTITE	6003-000010	BWN+,B,M3,L10	7	
33	SHIELD CDT	BN70-10344C	SPTE T0.26	1	

NO.	DESCRIPTION	CODE NO.	SPECIFICATION	Q'TY	REMARK
34	LOCKER WIRE	BN64-30002A	DARW 60 N,NYLON66,NTR	2	
35	SCREW-TAPTITE	6003-000122	BN+,M4,L12,ZPC(YEL)	3	
36	UNIT STAND	BN75-10455D	ABS HB V16	1	
37	SCREW-TAPTITE	6003-000009	BN+,M4,L16,ZPC(YEL)	2	
38	BRKT SMPS	BN70-10412A	SECC T1.0	1	
39	SHIELD SMPS	BN71-10359A	A1050S T1.0	1	
40	SCREW-TAPTITE	6003-000129	BN+,S,M4,L10,ZPC(YEL)	1	
41	WASHER SPRING	6031-000348	M4,D4.1,OD7.6,T1.7,ZPC(YEL),S	1	
42	SCREW-TAPTITE	6002-000129	FN+,2S,M3,L8,ZPC(BLK)	2	
43	SCREW-TAPTITE	6003-000122	BN+,M4,L12,ZPC(YEL)	1	
44	SCREW-TAPTITE	6003-000010	BWN+,B,M3,L10	4	
45	ASS'Y HEAT SINK	BN99-10044B	H/S IC,SPR NG,SCREW,STR S	1	
46	ASS'Y HEAT SINK	BN99-10021A	H/S TR,SCREW-NUT,STR81145	1	
47	SHIELD RIGHT	BN71-10355A	SECC T0.8	1	
48	SCREW-TAPTITE	6003-000122	BN+,M4,L12,ZPC(YEL)	5	
49	SCREW-TAPTITE	6003-000015	BN+,M3,L8,ZPC(YEL)	4	
50	CABLE CLAMP	6502-000137	DAWS 3NA, D10,NTR,NYLON66	3	
51	ASS'Y HEAT SINK	BN99-10010Y	H/S TR,SCREW-NUT,FMP C2FS	1	
52	CABLE CLAMP	6502-000135	DAWS 2NA	1	



8-3 Rear Cover Ass'y

NO	DESCR PT ON	CODE NO.	SPEC F CAT ON	Q'TY	REMARK
53	SH E_D V DEO	BH71 10358A	SECC T0.5	1	
54	SCREW TAPT TE	6003 000010	BWH+,B,M3,_10	4	
55	JN T/BRKT-BNC	BH75 10498A	SPTE T0.5	1	
56	SH E_D REAR	BH71 10357B	A1050S T1.0	1	
57	ASS'Y HEAT/S NK	BH99 10050E	H/S C,SCREW+NUT,VPS14	1	
58	SCREW TAPT TE	6003 000122	BH+,M4,_12,ZPC(YE_)	6	
59	SCREW TAPT TE	6003 000010	BWH+,B,M3,_10	6	
60	SHIE_D _EFT	BH71 10356B	SECC T0.8	1	
61	SCREW TAPT TE	6003 000122	BH+,M4,_12,ZPC(YE_)	4	
62	SHEET-ANODE	BH72 10352A	ABS+PC V2 T1.0	1	
63	SH E_D TOP	BH71 10374B	A1050S T0.5	1	
64	SCREW TAPT TE	6003 000122	BH+,M4,_12,ZPC(YE_)	6	
65	COVER REAR	BH72 60430XHD	ABS HB V16	1	
66	CAP SCREW	BH72 60448D	PC+ABS 5V V16	2	
67	SCREW TAPT TE	6003 000124	BH+,M4,_25,ZPC(YE_)	2	
68	SCREW TAPT TE	6003 000009	BH+,M4,_16,ZPC(YE_)	2	
69	COVER TOP	BH72 60431XHD	ABS HB V16	1	
70	_ABE_ RAT NG	BH68 40352A	S/M100P,PE T0.075	1	
71	SH E_D FBT	BH70 10540A	SECC T0.5	1	
72	SCREW TAPT TE	6003 000122	BH+,M4,_12,ZPC(YE_)	1	



Memo

9 Electrical Parts List

9-1 Main PCB Parts

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
C201	301.7	232.1	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C202	304.6	232.1	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C204	174.7	236.9	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C205	174.9	133.8	2401-000027	(T)50V 4.7M	CAP-AL.ELEC,475M,1H	
C206	258.6	218.9	2201-000144	CAP-CERAMIC,101J,1H,NPO	100PF,50V,5%,NPOPPM,NPO,DISC-	
C207	272.7	214.5	2201-000144	CAP-CERAMIC,101J,1H,NPO	100PF,50V,5%,NPOPPM,NPO,DISC-	
C208	304.7	219.5	2401-000025	(T)16V 100M	CAP-AL.ELEC,107M,1C	
C209	314.7	200.7	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C210	303.9	207.4	2401-000053	(T)25V 10M	CAP-AL.ELEC,106M,1E	
C211	307.4	190.8	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C212	312	197.8	2401-000053	(T)25V 10M	CAP-AL.ELEC,106M,1E	
C213	236.7	196.8	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C214	271.7	179	2201-000423	C-CERAMIC,DISC	27pF,5%,50V,NPO,5.0x3.0,2.5mm	
C215	275.5	179.1	2201-000391	C-CERAMIC,DISC	22pF,5%,50V,SL,5.0x3.0,2.5mm,T	
C216	238.4	201	2201-000144	CAP-CERAMIC,101J,1H,NPO	100PF,50V,5%,NPOPPM,NPO,DISC-	
C218	299.5	131	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C219	304.8	125.9	2401-000025	(T)16V 100M	CAP-AL.ELEC,107M,1C	
C220	295.5	121	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C221	300.3	120.1	2401-000025	(T)16V 100M	CAP-AL.ELEC,107M,1C	
C222	279.1	172.8	2201-000009	C-CERAMIC,DISC	22pF,5%,50V,NPO,4x3.5,5,TP	
C223	282.6	172.8	2201-000009	C-CERAMIC,DISC	22pF,5%,50V,NPO,4x3.5,5,TP	
C224	212.3	193.3	2401-000025	(T)16V 100M	CAP-AL.ELEC,107M,1C	
C225	268	164.9	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C226	215.1	237.1	2401-000053	(T)25V 10M	CAP-AL.ELEC,106M,1E	
C227	299.2	211	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C228	293.7	235.6	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C229	322.7	202.7	2401-000053	(T)25V 10M	CAP-AL.ELEC,106M,1E	
C301	272.8	118.7	2305-000291	(T)63V 224J	CAP-MPETP,224J,1J,5P	
C302	267.2	118.7	2305-000001	C-FILM,MPEF	470nF,10%,63V,6.0X15.5X7.5,5mm	
C303	260.9	118.6	2401-000031	C-AL	47uF,20%,16V,GP,6.3x11mm,5mm,T	
C305	167.1	156.2	2202-000561	C-CERAMIC,MLC-RADIAL	680pF,5%,50V,NPO,5.1x3.2,5.1,T	
C306	259.2	127.1	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C308	166.7	178.8	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C309	136.9	163.8	2401-000038	C-AL	470uF,20%,25V,GP,10x12.5mm,5mm	
C310	144.5	165.9	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C311	177	178.4	2401-000324	(T)100UF,35V,20%,R-RADIAL	CAP-AL.ELEC,107M,1V,6.3x11	
C312	182.9	196.9	2401-000037	C-AL	470uF,20%,16V,GP,8x11.5mm,5mm	
C313	177.4	190.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C314	183.2	173.5	2305-000291	(T)63V 224J	CAP-MPETP,224J,1J,5P	
C315	174.3	156.2	2301-000013	(T)100V 472J	CAP-MYLAR,472J,2A,5P	
C316	197.5	148.4	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C401	283.4	81.3	2401-001874	(T)100UF,25V,20%,R-RADIAL	CAP-AL.ELEC,107M.1E,105C,10x12.5	
C402	307.3	82	2401-000053	(T)25V 10M	CAP-AL.ELEC,106M,1E	
C403	301.3	100.3	2301-000174	(T)100V 153J	CAP-MYLAR,153J,2A,5P	
C404	292.1	104.5	2301-000011	(T)100V 102J	CAP-MYLAR,102J,2A,5P	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
C405	286.1	104.6	2202-000003	C-CERAMIC,MLC-RADIAL	680pF,0.02,100V,NPO,5.1x5.1x3.	
C406	270.3	86.2	2401-000053	(T)25V 10M	CAP-AL.ELEC,106M ,1E	
C407	288.1	84.1	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C408	293.9	84.1	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20% ,50V,Y5V,2.3X3.0	
C409	281.9	99.6	2301-000011	(T)100V 102J	CAP-MYLAR,102J ,2A,5P	
C410	302.8	89.4	2202-000321	CAP-CERAMIC,104J ,1H	100NF,50V,5% ,X7R,RE-RADIAL,DIPP	
C411	230.8	112.5	2201-000378	C-CERAMIC,DISC	220pF,5% ,50V,Y5P,4x4,5,TP	
C412	252.3	93.4	2301-000018	(T)100V 473J	CAP-MYLAR,473J ,2A,5P	
C413	245.7	86.7	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C414	215	96.1	2401-000925	(T)22UF,250V,20% ,R-RADIAL	CAP-AL.ELEC,226M .2E,10X20	⚠
C415	213.3	117.7	2301-000020	(T)100V 273J	CAP-MYLAR,273J ,2A,5P	
C416	146.5	85.5	2401-000331	C-AL	100uF,20% ,35V,LZ,8x11.5mm,5mm	
C417	163.4	76.8	2301-000184	C-FILM ,PEF	1nF,10% ,100V,5.3x10mm,5mm,TP	
C418	171.3	23.8	2403-000187	CAP-TANTAL,336K,1D	(T)33UF,20V,10% ,DIP-RADIAL,5M M	
C419	163.9	23.8	2403-000187	CAP-TANTAL,336K,1D	(T)33UF,20V,10% ,DIP-RADIAL,5M M	
C420	153.1	23.8	2403-000187	CAP-TANTAL,336K,1D	(T)33UF,20V,10% ,DIP-RADIAL,5M M	
C421	201	75.5	2201-000131	C-CERAMIC,DISC	100pF,10% ,2KV,Y5P,8x6,5,TP	⚠
C422	209.9	106.5	2201-000285	C-CERAMIC,DISC	1nF,10% ,1KV,Y5P,8.0X4.0,5,TP	
C423	175.5	41.3	2301-001180	C-FILM ,PPF	2.2nF,5% ,3KV,TP,22.5x15.5x22,7	⚠
C424	188.2	41.3	2301-001180	C-FILM ,PPF	2.2nF,5% ,3KV,TP,22.5x15.5x22,7	⚠
C425	171	107	2401-001030	C-AL	3.3uF,20% ,50V,WT,5x11mm,5mm,TP	
C426	191.7	134.4	2401-000037	C-AL	470uF,20% ,16V,GP,8x11.5mm,5mm	
C427	194.3	103.8	2305-000231	(T)63V 105K	CAP-MPETP,105K,1J ,5P	
C428	182.1	127.8	2305-000138	(T)63V 104J	CAP-MPETP,104J ,1J ,5P	
C430	196.3	79.9	2201-000291	CAP-CERAMIC,102K,2H,Y5P	1NF,500V,20% ,10% ,Y5P,DISC-RADIA	
C432	226.5	46.9	2303-000294	C-FILM ,PPF	150nF,0.05,250V,30x18mm,20mm,T	
C433	217.3	46.9	2303-000294	C-FILM ,PPF	150nF,0.05,250V,30x18mm,20mm,T	
C434	236.5	53.5	2306-000249	CAP-MPPF,684J ,2E,20P	680NF,250V,5% ,RE-RADIAL	
C435	248	61.6	2306-000197	C-FILM ,MPPF	390nF,5% ,250V,20*19*12,7.5mm,T	
C436	271	71.9	2306-000249	CAP-MPPF,684J ,2E,20P	680NF,250V,5% ,RE-RADIAL	
C437	287	66.2	2306-000131	C-FILM ,MPPF	150nF,5% ,250V,21.5x11mm,7.5mm	
C438	294.6	66.2	2303-000127	C-FILM ,PPF	120nF,5% ,250V,29x16.5mm,25.5mm	
C440	292.6	147.8	2301-000016	C-FILM ,PEF	22nF,5% ,100V,7.2x4.5x9.0mm,5mm	
C441	286.1	159.2	2401-000027	(T)50V 4.7M	CAP-AL.ELEC,475M ,1H	
C442	283.3	149.8	2301-000018	(T)100V 473J	CAP-MYLAR,473J ,2A,5P	
C444	285.8	145.7	2202-000003	C-CERAMIC,MLC-RADIAL	680pF,0.02,100V,NPO,5.1x5.1x3.	
C445	278.4	154.2	2401-000586	C-AL	1uF,20% ,50V,BP,6x11mm,5mm,TP	
C446	265.7	148.6	2305-000291	(T)63V 224J	CAP-MPETP,224J ,1J ,5P	
C447	271.4	148.5	2401-000053	(T)25V 10M	CAP-AL.ELEC,106M ,1E	
C448	235.9	147.1	2305-000138	(T)63V 104J	CAP-MPETP,104J ,1J ,5P	
C449	231.8	158.1	2401-000025	(T)16V 100M	CAP-AL.ELEC,107M ,1C	
C450	232.2	137.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C451	208.3	134.4	2401-000317	C-AL	100uF,20% ,25V,WT,8x11.5mm,5mm	
C452	218.8	132.4	2401-000039	C-AL	1000uF,20% ,16V,GP,10x16mm,5mm	
C453	234	233.7	2401-001016	C-AL	3.3uF,20% ,50V,BP,6x11mm,5mm,TP	
C454	163.6	109.8	2301-000015	C-FILM ,PEF	10nF,5% ,100V,7x3.2x7mm,5mm,TP	
C455	263.2	22.9	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
C456	280.1	66.2	2306-000125	C-FILM,MPPF	120nF,5%,250V,21.5x11mm,7.5mm	
C458	265.2	138	2202-000003	C-CERAMIC,MLC-RADIAL	680pF,0.02,100V,NPO,5.1x5.1x3.	
C459	293.2	157.8	2301-000018	(T)100V 473J	CAP-MYLAR,473J,2A,5P	
C460	280.8	117.8	2401-001016	C-AL	3.3uF,20%,50V,BP,6x11mm,5mm,TP	
C461	167.8	36.6	2305-000138	(T)63V 104J	CAP-MPETP,104J,1J,5P	⚠
C466	249.4	160.5	2401-000053	(T)25V 10M	CAP-AL.ELEC,106M,1E	
C470	233.9	210.3	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C501	102.2	140	2401-001556	C-AL	47uF,20%,35V,GP,8x11.5mm,5mm,T	
C502	76.4	146.9	2201-000012	C-CERAMIC,DISC	220pF,10%,1KV,Y5P,6.3x5,5,TP	
C503	100.6	125.5	2305-000175	C-FILM,MPEF	10nF,5%,100V,12*12.5*6.5,5mm,T	
C504	82.4	113.1	2303-000145	C-FILM,PPF	1nF,10%,2KV,23x13mm,7.5mm,TP	⚠
C505	33.2	174.6	2401-000925	CAP-AL.ELEC,226M.2E	(T)22UF,250V,20%,10X20,R-RADIAL	
C506	93.2	98	2306-000187	400V 334J	CAP-MPPF,334J,2G	
C507	45.3	82.2	2401-000026	C-AL	3.3uF,20%,50V,GP,5x11mm,5mm,TP	
C508	33.6	64	2301-000015	C-FILM,PEF	10nF,5%,100V,7x3.2x7mm,5mm,TP	
C509	25.9	82.1	2401-000041	(T)16V 220M	CAP-AL.ELEC,227M,1C	
C510	23.5	50.7	2401-000545	C-AL	15uF,20%,35V,WT,5x11mm,5mm,TP	
C511	26.6	43.2	2201-000163	C-CERAMIC,DISC	10nF,+80-20%,50V,Y5V,6.5x5mm,2	
C512	46.4	68.9	2301-000010	C-FILM,PEF	100nF,5%,100V,11.5x12.5mm,5mm	
C513	42.2	63.1	2202-000003	C-CERAMIC,MLC-RADIAL	680pF,0.02,100V,NPO,5.1x5.1x3.	
C514	46.8	43.6	2401-000031	C-AL	47uF,20%,16V,GP,6.3x11mm,5mm,T	
C515	34.3	43.2	2201-000163	C-CERAMIC,DISC	10nF,+80-20%,50V,Y5V,6.5x5mm,2	
C516	56.7	102.7	2401-001576	C-AL	47uF,20%,50V,GP,8x11.5mm,5mm,T	
C517	41.3	102.8	2401-000026	C-AL	3.3uF,20%,50V,GP,5x11mm,5mm,TP	
C518	110.2	81.3	2305-000009	C-FILM,MPEF	100nF,5%,250V,13x11x6.5,7.5mm	
C519	39.9	115.4	2202-000319	C-CERAMIC,MLC-RADIAL	100nF,10%,100V,X7R,7.6x9.1,5.1	
C520	24.1	111.9	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C521	53.3	25.8	2305-000138	(T)63V 104J	CAP-MPETP,104J,1J,5P	⚠
C522	55.6	14.3	2401-001016	C-AL	3.3uF,20%,50V,BP,6x11mm,5mm,TP	
C523	49.8	87.9	2401-000053	(T)25V 10M	CAP-AL.ELEC,106M,1E	
C524	24.1	59.9	2301-000010	C-FILM,PEF	100nF,5%,100V,11.5x12.5mm,5mm	
C525	29.4	98.7	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C528	76.5	161.6	2301-000020	(T)100V 273J	CAP-MYLAR,273J,2A,5P	
C529	65.8	182.1	2401-000053	(T)25V 10M	CAP-AL.ELEC,106M,1E	
C540	130.5	77	2201-000014	CAP-CERAMIC,331K,3A,DISC	330PF,1KV,10%,Y5P,DISC-RADIAL	⚠
C541	81	181.4	2401-000043	C-AL	1uF,20%,160V,GP,6.3x11mm,5mm,T	
C542	86.7	169.1	2306-000164	C-FILM,MPPF	220nF,5%,250V,19x22x10,7.5mm,T	
C543	133.5	111.1	2201-000291	CAP-CERAMIC,102K,2H,Y5P	1NF,500V,20%,10%,Y5P,DISC-RADIA	⚠
C544	52.9	65	2202-000470	C-CERAMIC,MLC-RADIAL	330pF,5%,100V,NPO,5.1x5.1x3.2	
C545	40.9	43.2	2301-000015	C-FILM,PEF	10nF,5%,100V,7x3.2x7mm,5mm,TP	
C546	38.2	25.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C547	61.6	76.1	2305-000138	(T)63V 104J	CAP-MPETP,104J,1J,5P	⚠
C548	52.6	204.1	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C549	62.6	160.8	2301-000294	C-FILM,PEF	56nF,5%,100V,9.5x12.5mm,5mm,TP	
C550	84.5	222.8	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C551	30.7	38.2	2301-000018	(T)100V 473J	CAP-MYLAR,473J,2A,5P	
C552	56.9	185.2	2401-000649	C-AL	2.2uF,20%,50V,BP,6x11mm,5mm,TP	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
C553	60.1	176	2301-000294	C-FILM ,PEF	56nF,5% ,100V,9.5x12.5mm,5mm,TP	
C554	69.7	164.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
CN221	4.7	239.2	3711-003242	CONNECTOR-HEADER	NOWALL,56P,2R,2.54mm,STRAIGHT	
CN402	137	230.8	3711-000154	STRAIGHT,1WALL,SN	CON-WALL HEADER,15P,2.5M	
CN405	272.6	239.1	3711-000197	CONNECTOR-HEADER	1WALL,3P,1R,2.5mm,STRAIGHT,SN	
D201	317.2	200.7	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D202	234.2	180.9	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D302	141.4	168	0402-000128	70V,1A,1.1V,1A,2000NS,0.5A	DIODE-REC,1N4002,DO-41	
D401	303	76.1	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D402	299.9	76.1	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D403	230.6	80.6	0402-000274	400V,1A,1V,1A,50NS,0.5A	DIODE-REC,UF4004,DO-41	
D404	262.1	106.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D405	241.2	117.1	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D406	248.8	100.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D407	243.2	89.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D408	209.3	110.9	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D409	155.2	72.9	0402-000274	400V,1A,1V,1A,50NS,0.5A	DIODE-REC,UF4004,DO-41	
D410	158.6	28.3	0402-000126	DIODE-RECTIFIER	1N4001GP,50V,1A,DO-41	
D411	147.7	17.3	0402-000126	DIODE-RECTIFIER	1N4001GP,50V,1A,DO-41	
D412	144	17.3	0402-000126	DIODE-RECTIFIER	1N4001GP,50V,1A,DO-41	
D413	244.2	7.5	0402-000445	ST 02169-205-180	DIODE-REC,MUR10150E,TO-220	
D414	241.9	64.6	0402-000272	50V,1A,1V,1A,50NS,0.5A	DIODE-REC,UF4001,DO-41	
D415	271.7	14.6	0402-000007	DIODE-RECTIFIER	1N4937GP,600V,1A,DO-41	
D416	282.7	18.6	0402-000007	DIODE-RECTIFIER	1N4937GP,600V,1A,DO-41	
D417	305.9	158.6	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D418	311	88.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D419	234.4	75.7	0402-000274	400V,1A,1V,1A,50NS,0.5A	DIODE-REC,UF4004,DO-41	
D420	250.6	167.2	0401-000005	DIODE-REC	EK-04, 40V, 1.5A, DO-41	
D502	65.6	117.6	0404-000001	DIODE-SCHOTTKY	FMP-G2FS,1500V,5A,50UA,TO-220	⚠
D503	56.4	112.3	0402-000274	400V,1A,1V,1A,50NS,0.5A	DIODE-REC,UF4004,DO-41	
D504	39.3	184.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D506	41.5	75.9	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D507	23.7	34.9	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D508	99.3	85.3	0402-000007	DIODE-RECTIFIER	1N4937GP,600V,1A,DO-41	
D510	62	94.9	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D511	30.5	112.3	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D512	25.4	72.2	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D514	86.3	188.7	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D515	96.5	182.6	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D516	96.5	179.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D522	30.7	63.1	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
IC201	288.5	205.9	0903-001063	IC-MICROCONTROLLER	72E75,8BIT,DIP,42P,600MIL,24MH	⚠
IC202	309.5	201.6	1203-000495	TO-92,3,+4.5V	IC-LIN,7045,REGULATOR	
IC203	303.6	197.3	1103-001086	IC-EEPROM	24LC08B,256x8BIT,DIP,8P,300MIL	⚠
IC301	167.8	164.1	1204-000308		IC-LIN,8172,VERTICAL	⚠
IC401	293.1	95.6	1203-001099	IC-PWM CONTROLLER	3843,DIP,8P,250MIL,PLASTIC,30V	⚠ ⚠
IC402	174.8	106.2	1201-000109	IC-AUDIO AMP	2006,HENTWAT,5P,SINGLE,PLA	⚠

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
IC403	296.8	137.9	1204-001323	IC-DEF. PROCESSOR	TDA9110,DIP,32P,300MIL,PLASTIC	⚠
IC404	195.8	238.8	1201-001034	IC-AMPLIFIER	L272M,DIP,8P,28V,1A,1W,STICK	⚠
IC405	212.8	139.6	1203-000165	IC-POSI.ADJUST REG.	78R12,TO-220,3P,12V,0to+	⚠
IC501	46.1	56.7	1203-000182	IC-POSI.ADJUST REG.	494,DIP,16P,300MIL,PLASTIC	⚠
IC502	44.6	115.5	1203-000002	IC-POSI.ADJUST REG.	431,TO-92,3P,PLASTIC,2.44/2.	
IC503	63.8	172.2	1201-000420	IC-OP AMP	358,DIP,8P,300MIL,DUAL,100V/mV	
L201	237.1	220	2701-000112	INDUCTOR-AXIAL	100uH,10%,2.8x7mm	
L401	228.9	127.2	2701-000154	FIX,220UH,10%,4X10.5MM	INDUCTOR-AXIAL,220UH	
L402	204.3	29.3	BH27-20344M	COIL-CHOKE	3.5MH,10%,DR14*20,BULK	
L404	309.3	23	2701-000128	INDUCTOR-AXIAL	15uH,10%,4.2x9.8mm	
L406	179.3	82.3	BH26-30337W	TRANS-H.LINEARITY	85.0MH,6P,DR14*15,L-81,85MH/1.	⚠
L501	22.8	90.9	2701-000179	INDUCTOR-AXIAL	33uH,10%,4.2x9.8mm	
L502	57.7	137.3	BH27-20344M	COIL-CHOKE	3.5MH,10%,DR14*20,BULK	
L503	65.3	103	2701-000154	FIX,220UH,10%,4X10.5MM	INDUCTOR-AXIAL,220UH	
L504	57.6	72.1	2701-000154	FIX,220UH,10%,4X10.5MM	INDUCTOR-AXIAL,220UH	
Q201	161.8	237.4	0501-000122	0.625W,60V,40V,6V,0.2A	TR-NPN,2N3904,TO-92,EBC	
Q202	153.7	237.4	0501-000122	0.625W,60V,40V,6V,0.2A	TR-NPN,2N3904,TO-92,EBC	
Q204	314.2	231.3	0501-000586	0.25W,60V,50V,5V,0.15A	TR-NPN,KSC945,TO-92,EBC	
Q401	306.1	100.5	0501-000303	0.25W,-60V,-50V,-5V,-0.15A	TR-PNP,KSA733,TO-92,EBC	
Q402	243.8	117.4	0501-000122	0.625W,60V,40V,6V,0.2A	TR-NPN,2N3904,TO-92,EBC	
Q403	224.2	112.7	0501-000122	0.625W,60V,40V,6V,0.2A	TR-NPN,2N3904,TO-92,EBC	
Q405	232.8	95.6	0505-001130	FET-SILICON	IRF740A,N,400V,10uA,550mohm,13	
Q406	158.3	75.4	0505-001136	FET-SILICON	IRF610A,N,200V,3.3A,1.5ohm,38W	
Q407	184.4	7.6	0502-000364	TR-POWER	MJL16218,NPN,170W,TO-3P,BK,3-1	⚠
Q408	233.2	26.1	0505-001135	FET-SILICON	IRF640A,N,200V,18A,0.18ohm,139	
Q409	249.1	34.6	0505-001135	FET-SILICON	IRF640A,N,200V,18A,0.18ohm,139	
Q410	273.9	34.6	0505-001135	FET-SILICON	IRF640A,N,200V,18A,0.18ohm,139	
Q411	299.5	39.5	0505-001129	FET-SILICON	IRF630A,N,200V,10uA,400mohm,72	
Q412	304.8	60.2	0505-001129	FET-SILICON	IRF630A,N,200V,10uA,400mohm,72	
Q413	302.2	156.9	0501-000122	0.625W,60V,40V,6V,0.2A	TR-NPN,2N3904,TO-92,EBC	
Q414	260.4	17.1	0501-000586	0.25W,60V,50V,5V,0.15A	TR-NPN,KSC945,TO-92,EBC	
Q415	242.1	130.9	0501-000586	0.25W,60V,50V,5V,0.15A	TR-NPN,KSC945,TO-92,EBC	
Q416	237.7	130.9	0501-000303	0.25W,-60V,-50V,-5V,-0.15A	TR-PNP,KSA733,TO-92,EBC	
Q417	217.8	144.9	0501-000586	0.25W,60V,50V,5V,0.15A	TR-NPN,KSC945,TO-92,EBC	
Q501	71.2	148.1	0505-001136	FET-SILICON	IRF610A,N,200V,3.3A,1.5ohm,38W	
Q502	124.8	111.5	0502-001001	TR-POWER	KSC5088,NPN,1500V,1500V,8A,50W	⚠
Q503	51.8	110.2	0505-001130	FET-SILICON	IRF740A,N,400V,10uA,550mohm,13	
Q504	28	29	0501-000303	0.25W,-60V,-50V,-5V,-0.15A	TR-PNP,KSA733,TO-92,EBC	
Q505	38.4	77.2	0501-000483	TR-SMALL SIGNAL	KSP2222A,NPN,625mW,TO-92,TP,10	
Q506	27.1	118.4	0501-000303	0.25W,-60V,-50V,-5V,-0.15A	TR-PNP,KSA733,TO-92,EBC	
Q507	77	165.4	0502-001060	TR-POWER	KSC5042M,NPN,4W,TO-126,ST,30-	
Q508	124.7	177.3	0501-000140	TR-SMALL SIGNAL	2N5551,NPN,625mW,TO-92,80-25	
Q509	113.6	179.1	0502-000351	ST 02149-302-920	AM TR-PNP,TIP30C,TO-220	
Q510	87.5	182.4	0502-000348	2W,100V,100V,5V,1A	TR-NPN,TIP29,TO-220,BCE	
Q511	35.2	23.9	0501-000586	0.25W,60V,50V,5V,0.15A	TR-NPN,KSC945,TO-92,EBC	
Q512	23.7	28.9	0501-000586	0.25W,60V,50V,5V,0.15A	TR-NPN,KSC945,TO-92,EBC	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
Q513	52.1	170.1	0501-000586	0.25W,60V,50V,5V,0.15A	TR-NPN,KSC945,TO-92,EBC	
Q514	61.3	189.4	0501-000586	0.25W,60V,50V,5V,0.15A	TR-NPN,KSC945,TO-92,EBC	
R201	286	221	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R202	296.4	223.7	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R203	296.6	221	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R204	267.6	233.7	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R205	270.4	233.7	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R207	264.7	233.7	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R208	277.6	233.7	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R209	171.1	126.9	2001-000075	R-CARBON	39Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R210	294.5	166.8	2001-000051	R-CARBON	2.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R211	296.9	166.8	2001-000051	R-CARBON	2.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R212	309.8	220.2	2001-000889	REF-CF,6.8K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R213	250.6	174.6	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R214	246.8	174.5	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R215	259.9	165.1	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R216	257.2	165.1	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R217	254.5	165.1	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R218	138.5	222.7	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R219	157.6	231.2	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R220	166	239.2	2001-000722	R-CARBON	4.3Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R221	169	239.2	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R222	288.5	211	2001-000054	REF-CF,3.9K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R223	280.6	210	2001-000054	REF-CF,3.9K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R224	278.1	221	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R225	266.9	220.7	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R226	264.2	220.7	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R227	261.5	220.7	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R230	254.9	220	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R231	252.3	220	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R232	281.7	175.7	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R233	279.1	175.7	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R236	260	185.5	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R237	257.2	185.5	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R238	254.5	175.5	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R239	240.8	192.9	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R240	268.5	186.4	2001-000738	R-CARBON	4.7M ohm,5%,1/6W,AA,TP,1.8x3.2m	
R242	312	207.7	2001-000035	REF-CF,220,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R243	299.3	187.3	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R244	296.8	187.3	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R245	320.7	225.2	2001-000488	R-CARBON	200ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R246	314.9	211.3	2001-001178	REF-CF,680,5%,1/2W(S)	300V,-200 TO +200PPM/C,R-AXIAL	
R247	317.8	211.3	2001-001192	REF-CF,820,5%,1/2W(S)	300V,-350 TO +350PPM/C,R-AXIAL	
R248	312.2	211.3	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R249	309.4	138.9	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R250	309.4	141.7	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R251	310.5	133.8	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
R252	310.5	136.4	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R253	127	224.4	2003-000631	R-METAL OXIDE(S)	3.3ohm,5%,3W,AA,TP,6x16mm	
R254	283.6	220	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R269	211.2	239.2	2001-000086	REF-CF,100K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R271	240.1	220.1	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R272	116.5	222.8	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R273	35.9	205.4	2004-000252	R-METAL	11Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
R274	300.4	110.6	2001-000074	R-CARBON	33Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R275	234.1	189.9	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R276	258.4	208.2	2004-000458	R-METAL	2.2Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R301	202.8	125.5	2004-000150	R-METAL	1.5Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R303	169.8	178.8	2004-000970	R-METAL	470ohm,1%,1/4W,AA,TP,2.4x6.4mm	
R304	172.9	178.8	2004-000498	R-METAL	2.7Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R305	188.2	176.6	2001-000245	REF-CF,1.5,5%,1/2W	350V,-350 TO +350PPM/C,R-AXIAL	
R306	170.7	157.1	2004-001136	R-METAL	6.8Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R307	188.4	163.4	2003-000767	R-METAL OXIDE(S)	680ohm,5%,2W,AA,TP,4x12mm	
R308	193.4	148.4	2003-000412	REF-MO,0.9,5%,2W	350V,-350 TO +350PPM/C,R-AXIAL	
R309	163.7	157.1	2004-000284	R-METAL	12Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
R401	280.4	82.2	2001-000110	R-CARBON	10ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R402	297	76.1	2001-000963	R-CARBON	75Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R403	299.8	96	2001-000963	R-CARBON	75Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R404	297.9	106.1	2001-000072	R-CARBON	22Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R405	295.5	99.6	2001-000073	R-CARBON	33Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R406	265.2	92.8	2001-001178	REF-CF,680,5%,1/2W(S)	300V,-200 TO +200PPM/C,R-AXIAL	
R407	247.1	117.3	2001-000077	REF-CF,47K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R408	227.3	112.3	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R409	237.3	118.8	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R410	220.5	118.9	2001-000976	REF-CF,8.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R411	217.7	110.9	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R412	296.6	87	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R413	256.9	64.2	2003-000448	R-METAL OXIDE(S)	100Kohm,5%,2W,AA,TP,4x12mm	
R414	270.8	96.8	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R415	234.5	107.8	2004-000580	R-METAL	22Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
R416	268.2	106.8	2004-000899	R-METAL	4.7Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R418	242.6	86.7	2001-000059	REF-CF,5.6K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R419	240.2	100.8	2008-000147	REF-FUSIBLE,22,5%,1/4W	-350 TO +350PPM/C,R-AXIAL	
R420	246	100.8	2001-000889	REF-CF,6.8K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R422	154	118.8	2006-001048	R-CEMENT	68ohm,5%,5W,CA,BK,22x9.5x9.5mm	
R423	236.9	100.8	2008-000140	REF-FUSIBLE,2.2,5%,1/2W	-350 TO +350PPM/C,R-AXIAL	⚠
R424	162.4	95.6	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R425	167.1	65.8	2001-000036	R-CARBON	330ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R427	178.8	134.9	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R428	163.6	112.5	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R429	161.1	112.4	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R430	198.9	105.5	2001-000226	R-CARBON	1.2ohm,5%,1/2W,AA,TP,3.3x9mm	
R431	143.8	118.9	2006-001048	R-CEMENT	68ohm,5%,5W,CA,BK,22x9.5x9.5mm	
R432	262.5	53	2003-000423	REF-MO,1.2,5%,3W(T)	-359 TO +350PPM/C,R-AXIAL	

Loc.No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
R433	178.3	77.1	2003-000455	R-METAL OXIDE(S)	100ohm,5%,2W,AA,TP,4x12mm	
R434	232	31.7	2001-000086	REF-CF,100K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R435	317.9	161.2	2001-000889	REF-CF,6.8K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R436	305.1	155.6	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R437	253.2	54.1	2001-000086	REF-CF,100K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R438	274.8	55	2001-000086	REF-CF,100K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R439	299	47.8	2001-000086	REF-CF,100K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R440	299.5	36.4	2001-000104	REF-CF,1.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R441	299.9	60.2	2001-000086	REF-CF,100K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R442	302.5	36.4	2001-000108	REF-CF,18K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R443	296.2	36.5	2001-000108	REF-CF,18K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R444	280	30.8	2001-000104	REF-CF,1.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R446	235	22.5	2001-000104	REF-CF,1.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R447	249.8	30.7	2001-000104	REF-CF,1.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R448	253	30.6	2001-000108	REF-CF,18K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R449	309.8	60.3	2001-000104	REF-CF,1.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R450	314.6	60.3	2001-000108	REF-CF,18K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R451	205.4	239.3	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R452	202.9	239.3	2001-000765	R-CARBON	43Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R453	208.7	239.2	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R454	200	231.3	2001-000074	R-CARBON	33Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R455	179.8	239.3	2001-000022	R-CARBON(S)	33ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R456	184.7	231.2	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R457	220.2	240.6	2003-000744	R-METAL OXIDE(S)	56ohm,5%,2W,AA,TP,4x12mm	
R458	276.4	142.2	2004-004090	R-METAL	6.49Kohm,1%,1/4W,AA,TP,2.5x6.5	
R459	282.4	160.6	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R460	296.3	149	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R462	271.4	152.1	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R464	295.4	125.1	2001-000588	R-CARBON	3.3Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R465	287.4	120.9	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R468	208.7	168.6	2001-000074	R-CARBON	33Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R469	214.6	160.9	2001-000988	R-CARBON	820Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R470	211.5	161.2	2003-000650	R-METAL OXIDE(S)	330ohm,5%,2W,AA,TP,4x12mm	
R472	287.1	19.1	2001-000705	R-CARBON	39ohm,5%,1/2W,AA,TP,3.3x9mm	
R473	287.1	22.8	2001-000705	R-CARBON	39ohm,5%,1/2W,AA,TP,3.3x9mm	
R474	255.9	30.6	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R475	266.1	16.4	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R479	296.2	158.1	2001-000744	R-CARBON	4.7ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R480	290.5	121	2001-001139	R-CARBON(S)	39Kohm,5%,1/2W,AA,TP,2.4x6.4mm	
R481	277.4	107.7	2001-000836	R-CARBON	51Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R482	276.4	120.2	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R490	151	29.9	2003-000568	R-METAL OXIDE(S)	2.7ohm,5%,3W,AA,TP,6x16mm	
R491	249.8	75.7	2001-001187	R-CARBON(S)	75ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R492	230.9	66.3	2001-000117	R-CARBON(S)	68ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R494	290.1	151.2	2001-001052	R-CARBON(S)	1.5M ohm,5%,1/2W,AA,TP,2.4x6.4m	
R495	292.9	121	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R496	318.1	233	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
R497	30	46.2	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R498	188.4	61.3	2001-000037	R-CARBON(S)	330ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R501	66.9	146.3	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R502	93	147	2001-001093	R-CARBON(S)	2.2Kohm,5%,1/2W,AA,TP,2.4x6.4m	⚠
R503	123.3	151.8	2003-000505	R-METAL OXIDE(S)	150ohm,5%,3W,AA,TP,6x16mm	⚠
R504	108.6	132.7	2003-000514	R-METAL OXIDE(S)	15ohm,5%,2W,AA,TP,4x12mm	
R505	112	117.7	2001-001165	R-CARBON(S)	56ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R506	21.7	180.9	2008-000150	REF-FUSIBLE,3.3,5%,1/2W	-350 TO +350PPM/C,R-AXIAL	
R507	51.2	126.4	2001-001096	REF-CF,2.2,5%,1/2W(S)	300V,-200 TO +200PPM/C,R-AXIAL	
R508	31.3	23.9	2001-000051	R-CARBON	2.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R509	36.6	100.9	2001-000053	R-CARBON	3.3Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R510	39.3	63.2	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R511	28	72.2	2001-000069	R-CARBON	12Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R512	49.9	70	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	⚠
R513	49.1	56.7	2001-000057	R-CARBON	5.1Kohm,5%,1/6W,AA,TP,1.8x3.2m	⚠
R514	37.8	37.3	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R515	51.8	56.5	2001-000057	R-CARBON	5.1Kohm,5%,1/6W,AA,TP,1.8x3.2m	⚠
R516	48.6	104.7	2004-001198	R-METAL	68Kohm,1%,1/4W,AA,TP,2.4x6.4mm	⚠
R517	45.5	104.7	2004-000698	R-METAL	3.3Kohm,1%,1/4W,AA,TP,2.4x6.4m	⚠
R518	33	112.4	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R519	21.3	119.9	2001-000062	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R521	26.4	90.9	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R522	54.1	76	2001-001144	R-CARBON(S)	4.7Kohm,5%,1/2W,AA,TP,2.4x6.4m	
R523	49.3	25.8	2004-001319	R-METAL	86Kohm,1%,1/4W,AA,TP,2.4x6.4mm	⚠
R524	77.5	173	2001-000104	REF-CF,1.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R525	72.3	168.2	2004-001254	R-METAL	8.2Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R526	67.6	206.1	2004-000216	R-METAL	10Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
R527	57.6	189.4	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R528	70.6	186.5	2004-000657	R-METAL	27Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
R542	118	84	2001-000686	R-CARBON	390Kohm,5%,1/2W,AA,TP,3.3x9mm	
R543	126	73.1	2001-000395	R-CARBON	180Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R544	128.8	182.1	2004-000193	R-METAL	100Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R545	131.1	151.8	2004-000150	R-METAL	1.5Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R547	86.3	206.1	2001-000066	R-CARBON(S)	10Kohm,5%,1/2W,AA,TP,2.4x6.4mm	
R548	132.8	224.4	2003-000006	R-METAL OXIDE	47ohm,5%,1W,AA,TP,4.3x12mm	
R549	89.2	176.7	2001-000790	R-CARBON	47ohm,5%,1/2W,AA,TP,3.3x9mm	
R550	147.9	150.7	2004-000728	R-METAL	3.9Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R551	53.1	175	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R552	51.6	104.7	2004-000458	R-METAL	2.2Kohm,1%,1/4W,AA,TP,2.4x6.4m	⚠
R553	92.1	161.3	2001-001195	R-CARBON(S)	82ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R554	80.3	161.6	2004-000216	R-METAL	10Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
R555	60.2	218.2	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R556	225.3	231.3	2001-000069	R-CARBON	12Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R557	67.3	219.1	2001-000108	REF-CF,18K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R558	294.1	177.5	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R559	297.7	208.5	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R560	290.9	221.1	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	

Loc.No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
R561	41.2	25.3	2001-000082	R-CARBON	68Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R562	50	205.3	2004-000216	R-METAL	10Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
R563	47.8	186	2004-000698	R-METAL	3.3Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R564	55	189.4	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R565	47	205.3	2004-000657	R-METAL	27Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
R566	67.1	172.2	2004-001329	R-METAL	9.1Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R567	50.6	175	2004-000262	R-METAL	120Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R568	129.2	47.1	2001-000354	R-CARBON	150Kohm,5%,1/4W,AA,TP,2.4x6.4m	
SK501	131.7	36.4	4715-000001	SURGE ABSORBER	1KV,+50-10%	
T401	145	60.2	BH26-30336L	TRANS-H.D.T	5.0MH,10P,ER2828,PL-3,5.0MH/14	⚠
T402	208.1	80	BH26-30338G	TRANS-HOR.PULSE(TCO)	1.8mH,10P,EI3026,PL3,1.8mH/182	⚠
T403	263	80.3	BH26-30304F	TRANS-H-SIZE DRIVE	CORE/BOBBIN;EI16,CSG9511	⚠
T501	95.5	126.4	BH26-30304B	TRANS-HOR.DRIVE	1-8(210UH),8P,EI2218,SB-5S,T8	⚠
T502	83.9	62.1	BH26-10335K	TRANS-FBT	670UH,15P,670UH,Y265383	⚠
T503	43.8	138.7	BH26-30304X	TRANS-H/V REG.CFA7679	EI 28X20MM,CFA7679(PIN TYPE)	⚠
T504	99.7	158.6	BH26-30338H	TRANS-FOCUS	2.8mH,8P,EI2519,SB-5S,2.8MH/48	⚠
U2	136.9	11.1	BH62-30397A	HEAT/SINK-HOR	A1050S,T2,CGX1607	
VR401	311.6	20.2	2103-001049	VR-SEMI	100ohm,30%,1/3W,SIDE	
VR501	42.5	11.1	2103-000454	VR-SEMI	50Kohm, 25%, 0.3W, SIDE	☢
X201	269.5	182.9	2801-003413	CRYSTAL-UNIT	24MHz,30ppm,28-ABQ,18pF,20ohm	
ZD201	309.8	224.1	0403-000007	DIODE-ZENER	UZ6.2BM,6.2V,6.0-6.4V,500mW,DO	
ZD202	307.3	224.1	0403-000007	DIODE-ZENER	UZ6.2BM,6.2V,6.0-6.4V,500mW,DO	
ZD203	299.2	161.7	0403-000007	DIODE-ZENER	UZ6.2BM,6.2V,6.0-6.4V,500mW,DO	
ZD204	285.6	167.6	0403-000007	DIODE-ZENER	UZ6.2BM,6.2V,6.0-6.4V,500mW,DO	

9-2 Power PCB Parts

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
C601	150.2	40.3	2501-000203	CAP-M PAPER,474K,250VAC	470NF,250VAC,10%,X2,RE-RAD,25.4	⚠
C602	109.2	37.8	2501-000203	CAP-M PAPER,474K,250VAC	470NF,250VAC,10%,X2,RE-RAD,25.4	⚠
C603	119.7	22.9	2201-000024	C-CERAMIC,DISC	4.7nF,20%,250VAC,Y5U,16x7,7.5	⚠
C604	119.7	37.6	2201-000024	C-CERAMIC,DISC	4.7nF,20%,250VAC,Y5U,16x7,7.5	⚠
C605	74.7	103	2201-000012	C-CERAMIC,DISC	220pF,10%,1KV,Y5P,6.3x5,5,TP	⚠
C606	141.1	104.1	2201-000469	C-CERAMIC,DISC	330pF,10%,500V,Y5P,6x3.5,5,TP	
C607	203.4	44.3	2201-000023	C-CERAMIC,DISC	2.2nF,20%,125V,Y5U,11x7,5,TP	
C608	15	128.9	2201-000152	C-CERAMIC,DISC	10nF,+80-20%,1KV,Y5V,20*4,10,T	⚠
C609	62	42.8	2401-003180	C-AL	3.3uF,20%,450V,WT,TP,10x16,5	⚠
C610	47.4	140.1	2201-000365	C-CERAMIC,DISC	220pF,10%,2KV,Y5P,6.3X3.0,5,TP	⚠
C611	207	97.4	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C612	83.2	114.2	2301-000013	C-FILM,PEF	4.7nF,5%,100V,10.5x12.5x6.5,5m	
C613	14.3	118.3	2401-003003	ALCAPACITOR	68uF,20%,100V,GP,10x16mm,5mm,T	
C614	41	91.8	2201-000376	C-CERAMIC,DISC	220pF,5%,50V,SL,4x4,5,TP	
C615	19.1	101	2401-000032	C-AL	100uF,20%,50V,GP,10x16mm,5mm,T	
C616	48.5	91.2	2401-003222	C-AL	470uF,20%,63V,WT,TP,12.5X25,5	
C617	152.4	104.2	2401-000023	C-AL	1uF,20%,50V,GP,5x11mm,5mm,TP	
C620	61.6	34.1	2301-000010	C-FILM,PEF	100nF,5%,100V,11.5x12.5mm,5mm	
C621	101.4	83.2	2401-003180	C-AL	3.3uF,20%,450V,WT,TP,10x16,5	⚠
C622	49.3	146.7	2401-000028	C-AL	10uF,20%,50V,GP,5x11mm,5mm,TP	
C623	199.2	160	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C624	177.7	145.7	2401-000717	C-AL	2200uF,20%,25V,WT,12.5x25mm,5m	
C625	177.7	130.1	2401-000142	C-AL	1000uF,20%,16V,WT,10x20mm,5mm	⚠
C626	185.4	133.3	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C627	134.3	110.5	2301-000174	C-FILM,PEF	15nF,5%,100V,7.2x4.0x7.5mm,5mm	
C628	43.5	21.6	2306-000224	C-FILM,MPPF	47nF,5%,400V,16.5x12.5mm,7.5mm	⚠
C629	181.7	160.1	2401-000717	C-AL	2200uF,20%,25V,WT,12.5x25mm,5m	⚠
C630	51.8	41.2	2401-000317	C-AL	100uF,20%,25V,WT,8x11.5mm,5mm	
C631	19.6	17.9	2401-001392	C-AL	470uF,20%,250V,WT,30x45mm,10mm	⚠
C632	56.6	18	2401-001392	C-AL	470uF,20%,250V,WT,30x45mm,10mm	⚠
C633	25.3	123.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C634	166.4	160.1	2401-000183	C-AL	1000uF,20%,35V,WT,12.5x25mm,5m	⚠
C635	177.7	181.2	2401-000237	C-AL	100uF,20%,100V,WT,13x20mm,5mm	
C636	158.9	183.7	2401-003333	C-AL	68uF,20%,250V,WT,TP,16x25,7.5	
C637	146.3	115.5	2401-000613	C-AL	1uF,20%,50V,WT,5x11mm,5mm,TP	
C638	130.5	110.5	2301-000012	C-FILM,PEF	2.2nF,5%,100V,10.5x12.5x6.5,5m	
C639	40.7	158.6	2301-000015	C-FILM,PEF	10nF,5%,100V,7x3.2x7mm,5mm,TP	
C640	78.2	119.7	2301-000010	C-FILM,PEF	100nF,5%,100V,11.5x12.5mm,5mm	
C641	104.9	117.9	2201-000023	C-CERAMIC,DISC	2.2nF,20%,125V,Y5U,11x7,5,TP	⚠
C642	56.2	163.3	2401-000028	C-AL	10uF,20%,50V,GP,5x11mm,5mm,TP	
C643	31.8	154.8	2305-000291	C-FILM,MPEF	220nF,5%,63V,7.5x13.5mm,5mm,TP	
C701	17.9	155.6	2201-000322	C-CERAMIC,DISC	2.2nF,10%,2KV,Y5P,13x5,10,TP	
C702	40.2	190.7	2401-000037	C-AL	470UF,20%,16V,GP,8x11.5mm,5mm,TP	
C703	61	190.7	2401-000331	(T)35V100M	CAP-AL,ELE,107M,1V,8X11.5,105C	
C704	72.4	191.1	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C705	14.6	178.1	2401-001548	(T)25V47M	CAP-AL.ELEC,476M,1E,105C,6X11	

Loc.No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
C706	46.3	162	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C707	80.3	180.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C708	68.3	187.2	2401-000943	C-FILM,MPPF	47nF,5%,630V,21.5x12mm,7.5mm,T	
CN601	208.7	36.8	3711-003381	CONNECTOR-HEADER	1WALL,5P,1R,3.96mm,ANGLE,SN	
CN602	208.6	44.2	3711-003380	CONNECTOR-HEADER	1WALL,3P,1R,3.96mm,ANGLE,SN	
CN603	212	152	3711-003157	CONNECTOR-HEADER	NOWALL,15P,1R,2.5mm,ANGLE,SN	
CN604	210.7	82.2	3711-000058	CONNECTOR-HEADER	BOX,4P,1R,2.5mm,ANGLE,SN	
CN605	215.3	100.6	3711-002348	CONNECTOR-HEADER	BOX,2P,1R,2mm,ANGLE,SN	
CN606	215.3	92.2	3711-002348	CONNECTOR-HEADER	BOX,2P,1R,2mm,ANGLE,SN	
D601	165.6	76.8	0402-000549	DIODE-BRIDGE	PBS606G,600V,6A,BK	⚠
D602	71.1	47.8	0402-000008	DIODE-RECTIFIER	1N5399GP,1000V,1.5A,DO-15	
D603	43.7	109.7	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D604	32	115.2	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D605	94.6	66.4	0402-000008	DIODE-RECTIFIER	1N5399GP,1000V,1.5A,DO-15	
D606	37.5	134.2	0402-000012	ST02169-218-100	AM DIODE-REC,UF4007,DO-41	
D607	205.7	85.1	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D608	33.2	137.7	0402-000012	ST02169-218-100	AM DIODE-REC,UF4007,DO-41	
D609	70.5	113.9	0402-000274	400V,1A,1V,1A,50NS,0.5A	DIODE-REC,UF4004,DO-41	
D610	7	166.9	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D611	56.5	98.7	0402-000137	DIODE-RECTIFIER	1N4007,1000V,1A,DO-41	
D612	70.5	94.9	0402-000137	DIODE-RECTIFIER	1N4007,1000V,1A,DO-41	
D613	40.9	126.2	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D614	70.5	102.4	0402-000274	400V,1A,1V,1A,50NS,0.5A	DIODE-REC,UF4004,DO-41	
D615	48.4	128.6	0402-001039	DIODE-RECTIFIER	SB020,20V,600mA,MPG06	
D620	146.7	132.3	0402-000249	DIODE-RECTIFIER	RG4,400V,1.5A	
D621	126.7	140.1	0402-000249	DIODE-RECTIFIER	RG4,400V,1.5A	
D624	126.7	159	0402-000249	DIODE-RECTIFIER	RG4,400V,1.5A	
D629	126.7	147.6	0402-000249	DIODE-RECTIFIER	RG4,400V,1.5A	
D631	126.8	171.6	0402-000250	DIODE-RECTIFIER	RG4C,1000V,1A	
D632	126.7	178.6	0402-000250	DIODE-RECTIFIER	RG4C,1000V,1A	
D634	186	101.8	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D635	34.4	118.2	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	⚠
D701	16.5	159.9	0402-000012	ST02169-218-100	AM DIODE-REC,UF4007,DO-41	
D702	22.9	190	0402-000274	400V,1A,1V,1A,50NS,0.5A	DIODE-REC,UF4004,DO-41	
D703	35.3	164.6	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D704	10.1	145	0402-000012	ST02169-218-100	AM DIODE-REC,UF4007,DO-41	
D705	46	167.1	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
F601	66.6	17.9	3601-000455	FUSE-FERRULE	250V,4A,TIME-LAG,GLASS,5.2x20m	⚠
F602	152.2	146.9	3601-001092	FUSE-FERRULE	125V,2.5A,SLOW-BLOW,EPOXY,7.1x	
F604	159.2	168.3	3601-001092	FUSE-FERRULE	125V,2.5A,SLOW-BLOW,EPOXY,7.1x	
F605	150.8	136.1	3601-001092	FUSE-FERRULE	125V,2.5A,SLOW-BLOW,EPOXY,7.1x	
FH601	204.7	15.6	3602-000001	800GF,400-800GF	FUSE-CLIP,5.2X20,30M OHM	
IC601	56.8	81.6	BH13-10335N	IC-HYBRID	CSH780B,STR-S6719A,ZIP,9P,S/W	⚠
IC603	35.6	154.1	1203-000002	TO-92,3,36V(T)-SIMPLE	IC-LIN,431,REGULATOR	
IC604	152.6	110.5	1203-000002	TO-92,3,36V(T)-SIMPLE	IC-LIN,431,REGULATOR	⚠
IC605	54.7	155.1	1203-000495	IC-RESET	7045,T0-92,3P,PLASTIC,4.3/4.	
IC606	33	37.6	BH13-10302C	IC-HYBRID	CSG9511,STR81145A	⚠

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
IC701	20.4	171.1	BH13-10335Q	IC-HYBRID(POWER)	CGP1607T,TOP221Y,TO-220,3P,FET	
IC702	84.6	182.2	1203-000002	TO-92,3,36V(T)-SIMPLE	IC-LIN,431,REGULATOR	
L701	49.6	190.6	BH27-20342M	COIL-CHOKE4.7	4.7UH,25%,DR6.5*7.5,BULK	
LF601	165.6	18.8	BH27-20344R	COIL-LINEFILTER	5.8MH,MIN,SQE-2828,BULK	⚠
LF602	128.8	18.9	BH27-20344R	COIL-LINEFILTER	5.8MH,MIN,SQE-2828,BULK	⚠
NTC601	187.3	59	1404-001021	THERMISTOR-NTC	8ohm,15%,3250K,27.2mW/C,TP	⚠
OP602	113.1	111.4	0604-001018	PHOTO-COUPLER	DAR-TR,63-125%,200mW,DIP-4,ST	⚠
OP603	58.8	180	0604-001018	PHOTO-COUPLER	DAR-TR,63-125%,200mW,DIP-4,ST	
OP701	51.7	179.9	0604-001018	PHOTO-COUPLER	DAR-TR,63-125%,200mW,DIP-4,ST	
PTH601	185.1	39.1	1404-000135	20%,5-20%	THER,10,SQUARE13.5X17.7MM	⚠
Q601	201.5	92.9	0501-000010	0.8W,80V,60V,8V,0.7A	TR-NPN,KSC1008,TO-92,ECB	
Q602	29.3	118.2	0501-000483	TR-SMALLSIGNAL	KSP2222A,NPN,625mW,TO-92,TP,10	
Q603	44.9	121.1	0502-000291	TR-POWER	KSD401,NPN,25W,TO-220,120-24	
Q604	164.3	99.2	0505-000016	FET-SILICON	ZVN3310A,N,100V,200mA,10ohm,62	
Q606	53	129	0501-000303	TR-SMALLSIGNAL	KSA733-Y,PNP,250mW,TO-92,120	
Q607	178.6	99.2	0501-000586	TR-SMALLSIGNAL	KSC945-Y,NPN,250mW,TO-92,TP,12	
Q608	205.1	163.9	0501-000483	TR-SMALLSIGNAL	KSP2222A,NPN,625mW,TO-92,TP,10	
Q609	7.4	178.2	0501-000411	TR-SMALLSIGNAL	KSP2907A,PNP,625mW,TO-92,TP,10	
R601	157.6	28.3	2001-000506	REF-CF,220K,5%,1/4W	250V,-1000TO-500PPM/C,R-AXIAL	⚠
R602	157.6	41.6	2001-000506	REF-CF,220K,5%,1/4W	250V,-1000TO-500PPM/C,R-AXIAL	⚠
R603	90.8	33.6	2006-001047	R-METALOXIDE(S)	2.2ohm,5%,1W,AA,TP,3.3x9mm	
R605	17.6	140.3	2003-000011	R-METALOXIDE(S)	68Kohm,5%,3W,AA,TP,6x16mm	⚠
R606	29.5	99.7	2003-000631	R-METALOXIDE(S)	3.3ohm,5%,3W,AA,TP,6x16mm	
R607	48	84.5	2001-000070	R-CARBON	15Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R608	67.5	82.3	2005-001013	R-WIREWOUND,NON	0.14ohm,1%,3W,AA,TP,5.5x15mm	⚠
R609	75.1	76	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R610	78	88	2001-000060	R-CARBON	6.8Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R611	37.6	126.2	2008-000161	R-FUSIBLE	47ohm,5%,1/2W,AA,TP,3.5x9.4mm	
R612	49.5	113.2	2003-000014	R-METALOXIDE(S)	10Kohm,5%,3W,AA,TP,6x16mm	⚠
R613	47	102.6	2001-000575	R-CARBON	2Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R614	41.2	95.1	2001-000119	R-CARBON	680ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R615	127	110.5	2001-000042	R-CARBON	1Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R616	118.8	110.5	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R617	7	170.1	2001-000040	R-CARBON	470ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R620	190.6	88.8	2001-000790	REF-CF,47,5%,1/2W	350V,-350TO+350PPM/C,R-AXIAL	
R621	208.7	108.2	2001-000104	R-CARBON	1.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R622	80.2	33.7	2006-001047	R-CEMENT	2.7ohm,5%,7W,CH,BK,35X9.5x9.5m	
R623	199.2	157.2	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R624	94.5	100.9	2001-000096	R-CARBON(S)	1Mohm,5%,1/2W,AA,TP,2.4x6.4mm	
R625	185.5	106.9	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R626	186.9	176	2001-001131	R-CARBON(S)	33Kohm,5%,1/2W,AA,TP,2.4x6.4mm	
R627	206.9	172	2003-000141	R-METALOXIDE	100Kohm,5%,1W,AA,TP,4.3x12mm	
R628	49.5	106.3	2003-000631	R-METALOXIDE(S)	3.3ohm,5%,3W,AA,TP,6x16mm	
R629	60.4	160.7	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R630	38.5	147.6	2001-000048	R-CARBON	2.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R631	11	80.3	2003-000218	R-METALOXIDE	220Kohm,5%,2W,AA,TP,6x16mm	
R632	31	87.1	2003-000218	R-METALOXIDE	220Kohm,5%,2W,AA,TP,6x16mm	

Loc.No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
R633	46.6	28	2001-000017	R-CARBON	4.7ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R634	80.5	108.3	2001-000652	R-CARBON	330ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R635	41	147	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R636	77.4	191.1	2001-000040	R-CARBON	470ohm,5%,1/6W,AA,TP,1.8x3.2mm	⚠
R637	137.8	117	2001-000484	R-CARBON	200Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R638	169	172	2001-000065	R-CARBON	10Kohm,5%,1/4W,AA,TP,2.4x6.4mm	⚠
R639	156.8	146.8	2003-000521	R-METALOXIDE(S)	180Kohm,5%,1W,AA,TP,3.3x9mm	⚠
R640	158.9	111.2	2004-000458	R-METAL	2.2Kohm,1%,1/4W,AA,TP,2.4x6.4m	⚠
R641	150.8	140.7	2008-000102	R-FUSIBLE	0.22ohm,5%,1W,AA,TP,4.3x13mm	
R642	90.4	117.2	2001-000096	R-CARBON(S)	1Mohm,5%,1/2W,AA,TP,2.4x6.4mm	
R643	70.5	105.7	2001-000611	R-CARBON	3.9Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R644	140.9	125.5	2003-000534	R-METALOXIDE(S)	1Kohm,5%,1W,AA,TP,3.3x9mm	
R645	55.5	110.9	2001-000042	R-CARBON	1Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R646	170.6	99.2	2001-000059	R-CARBON	5.6Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R647	45.9	147	2004-000796	R-METAL	33Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
R648	48.6	161.2	2001-000057	R-CARBON	5.1Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R649	189.2	133.3	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R650	195.2	131.8	2001-000059	R-CARBON	5.6Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R651	206.2	151.8	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R652	62.8	161.4	2001-000496	R-CARBON	20Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R653	73.5	117	2001-000065	R-CARBON	10Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R654	42.9	150.2	2001-000496	R-CARBON	20Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R655	58.5	147	2001-000054	R-CARBON	3.9Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R656	59.3	150.9	2001-000074	R-CARBON	33Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R657	22	91.7	2001-001131	R-CARBON(S)	33Kohm,5%,1/2W,AA,TP,2.4x6.4mm	
R658	7	145	2001-001150	R-CARBON(S)	470Kohm,5%,1/2W,AA,TP,2.4x6.4m	
R659	9.5	160.4	2001-000562	R-CARBON	27Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R660	61.2	129	2001-000047	R-CARBON	2.2Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R661	18.3	136.8	2001-000848	R-METALOXIDE(S)	100Kohm,5%,1W,AA,TP,3.3x9mm	
R702	55.9	191.1	2001-000024	R-CARBON	47ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R703	75	191.1	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R704	87.6	189.5	2004-000580	R-METAL	22Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
R705	90.6	178.5	2004-000580	R-METAL	22Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
RL601	198.1	80.1	3501-000136	RELAY-MINIATURE	12V,360mW,5A,1FormA,10mS,10mS	⚠
T601	102	100.4	BH26-30338D	TRANS-POWERSYNC.	1.3MH/1.3MH,5P,SQN2115,M2A,1.3	⚠
T603	70.6	173	BH26-20335Y	TRANS-POWER	210UH/154UH,20P,EER4950,PM-2,7	⚠
T701	26.6	169	BH26-20336B	TRANS-POWER(DPMS)	3.5MH/14UH/77UH,8P,EE2229,SB5S	⚠
VAR601	200.3	32.7	1405-000180	640V,480V,270PF	VARI,679~829V,AXIAL,12MM	⚠
VR601	156.7	118	2103-000006	vr3	1/10W	⚠
ZD601	52.7	125.2	0403-000007	DIODE-ZENER	UZ6.2BM,6.2V,6.0-6.4V,500mW,DO	⚠
ZD602	56.1	134.6	0403-000007	DIODE-ZENER	UZ6.2BM,6.2V,6.0-6.4V,500mW,DO	⚠

9-3 Video PCB Parts

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
C101	45.4	100.9	2401-001509	(T)16V 47M	CAP-AL.ELEC,476M ,1C,6.3X7MM	
C102	50.5	97.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C103	51.3	89	2201-000013	CAP-CERAMIC,471K,1H,Y5P	470PF,50V,10% ,10% ,Y5P,DISC-RADI	
C104	182.3	109.6	2401-000443	(T)10UF,25V,20% ,R-RADIAL	CAP-AL,ELEC,106M ,1E,5X5	
C105	95.2	85.4	2201-000011	CAP-CERAMIC,470J ,1H,NPO	47PF,50V,5% ,NPOPPM ,NPO,DISC-R	
C106	95.2	95.9	2201-000011	CAP-CERAMIC,470J ,1H,NPO	47PF,50V,5% ,NPOPPM ,NPO,DISC-R	
C107	51.9	109.8	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C108	151	131.9	2401-001509	(T)16V 47M	CAP-AL.ELEC,476M ,1C,6.3X7MM	
C109	149.6	136.1	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20% ,50V,Y5V,2.3X3.0	
C110	90.5	139.2	2401-000027	C-AL	4.7uF,20% ,50V,GP,5x11mm,5mm,TP	
C111	95.5	139	2305-000291	C-FILM ,MPEF	220nF,5% ,63V,7.5x13.5mm,5mm,TP	
C112	90.9	148	2401-000042	(T)16V 100M	CAP-AL.ELEC,107M ,1C	
C113	96.8	162.2	2201-000197	C-CERAMIC,DISC	10pF,0.5pF,50V,NPO,4x3.5,5,TP	
C117	185.6	159.2	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20% ,50V,Y5V,2.3X3.0	
C118	85	187.9	2401-001869	CAP-AL.ELEC,107M .2A,10X20	(T)100UF,100V,20% ,R-RADIAL	
C119	89.8	177.7	2401-000042	(T)16V 100M	CAP-AL.ELEC,107M ,1C	
C120	45.5	109.7	2401-000042	(T)16V 100M	CAP-AL.ELEC,107M ,1C	
C121	182.2	136.5	2201-000502	C-CERAMIC,DISC	39PF,5% ,50V,5X3MM ,5MM	
C122	190.8	136.5	2301-000015	C-FILM ,PEF	10NF,5% ,100V,7X5.3X7MM ,5MM	
C123	183.9	125.5	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C124	189.2	132.6	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C125	194.1	132	2401-000042	(T)16V 100M	CAP-AL.ELEC,107M ,1C	
C126	196.9	141.5	2201-000502	C-CERAMIC,DISC	39PF,5% ,50V,5X3MM ,5MM	
C127	174.3	108.1	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C128	169.5	126.6	2401-000042	(T)16V 100M	CAP-AL.ELEC,107M ,1C	
C129	170.3	117.2	2401-000042	(T)16V 100M	CAP-AL.ELEC,107M ,1C	
C130	181.1	175.4	2401-000597	C-AL	1uF,20% ,50V,GP,4x7mm,1.5mm,TP	
C131	175.9	182.1	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C132	172.6	191.1	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C133	208.3	197.7	2301-000013	C-FILM ,PEF	4.7nF,5% ,100V,10.5x12.5x6.5,5m	
C134	215.6	202.7	2401-000597	C-AL	1uF,20% ,50V,GP,4x7mm,1.5mm,TP	
C135	214.4	206	2305-000009	(T)250V 104J	CAP-MPETP,104J ,2E,7.5P	
C136	219.9	213.8	2201-000291	C-CERAMIC,DISC	1nF,10% ,500V,Y5P,8.5x5MM ,5,TP	
C137	221	240.3	2401-001872	(T)250V 10M	CAP-AL.ELEC,106M ,2E,105C,10X16	
C138	211.4	233.1	2305-000009	(T)250V 104J	CAP-MPETP,104J ,2E,7.5P	
C139	123	126.8	2401-000597	C-AL	1uF,20% ,50V,GP,4x7mm,1.5mm,TP	
C140	103.8	139.8	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C141	207.3	166	2401-000443	(T)10UF,25V,20% ,R-RADIAL	CAP-AL,ELEC,106M ,1E,5X5	
C142	202.8	159	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C143	71.3	146.3	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20% ,50V,Y5V,2.3X3.0	
C144	231.3	213.8	2301-000015	C-FILM ,PEF	10nF,5% ,100V,7x3.2x7mm,5mm,TP	
C145	171.6	144.4	2401-000028	C-AL	10uF,20% ,50V,GP,5x11mm,5mm,TP	
C146	164.8	135.2	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20% ,50V,Y5V,2.3X3.0	
C147	146.6	187.9	2401-000043	C-AL	1uF,20% ,160V,GP,6.3x11mm,5mm,T	
C148	212.6	218	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
C149	175.8	138.9	2401-000443	(T)10UF,25V,20% ,R-RADIAL	CAP-AL,ELEC,106M ,1E,5X5	
C150	94.9	158.3	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	

Loc.No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
C151	225.2	177.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C152	233	166.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C153	226.2	149.9	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C154	231.8	149.9	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C155	155.2	135.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C156	233	203.8	2301-000011	C-FILM,PEF	1nF,5%,100V,10.5x12.5x6.5,5mm	
C157	222.9	181.7	2201-000504	C-CERAMIC,DISC	39pF,5%,50V,SL,5,TP	
C158	121.7	168.1	2401-000649	C-AL	2.2uF,20%,50V,BP,6x11mm,5mm,TP	
C160	152.7	187.9	2201-000019	C-CERAMIC,DISC	10nF,+80-20%,500V,Y5V,10x4,5,T	
C161	199.8	212.7	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C162	194.5	202.8	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C170	212.8	106.6	2401-000443	CAP-AL,ELEC,106M,1E,5X5	(T)10UF,25V,20%,R-RADIAL	
C171	212.8	116.3	2401-000027	C-AL	4.7uF,20%,50V,GP,5x11mm,5mm,TP	
C172	221.7	116.3	2401-000027	C-AL	4.7uF,20%,50V,GP,5x11mm,5mm,TP	
C175	233.6	116.3	2201-000138	C-CERAMIC,DISC	100pF,10%,50V,Y5P,4.0X4.0,2.5	
C176	229.8	116.3	2201-000138	C-CERAMIC,DISC	100pF,10%,50V,Y5P,4.0X4.0,2.5	
C177	225.9	106.6	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C178	221.7	106.6	2401-000443	CAP-AL,ELEC,106M,1E,5X5	(T)10UF,25V,20%,R-RADIAL	
C179	231.6	137.5	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C180	227.6	137.3	2401-000597	C-AL	1uF,20%,50V,GP,4x7mm,1.5mm,TP	
C182	217.5	132.3	2201-000138	C-CERAMIC,DISC	100pF,10%,50V,Y5P,4.0X4.0,2.5	
C183	205.5	132.3	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C184	205.4	126.5	2401-000443	(T)10UF,25V,20%,R-RADIAL	CAP-AL,ELEC,106M,1E,5X5	
C801	20	144.2	2401-001016	C-AL	3.3uF,20%,50V,BP,6x11mm,5mm,TP	
C802	15.2	136.1	2401-001016	C-AL	3.3uF,20%,50V,BP,6x11mm,5mm,TP	
C803	55.3	150.9	2401-000027	C-AL	4.7uF,20%,50V,GP,5x11mm,5mm,TP	
C804	68.7	139.3	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C805	53.6	131.9	2401-000027	C-AL	4.7uF,20%,50V,GP,5x11mm,5mm,TP	
C806	64.1	127.2	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C807	44	146.7	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C808	42.2	126.6	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C809	38.3	100.8	2401-000943	C-AL	22uF,20%,25V,GP,6.3x7mm,2.5mm	
C810	167.6	184.8	2401-000597	C-AL	1uF,20%,50V,GP,4x7mm,1.5mm,TP	
C811	160.8	184.8	2401-000597	C-AL	1uF,20%,50V,GP,4x7mm,1.5mm,TP	
C901	13	223.5	2201-000163	C-CERAMIC,DISC	10nF,+80-20%,50V,Y5V,6.5x5mm,2	
C902	6	219.5	2201-000643	CAP-CERAMIC,681K,1H,Y5P	680PF,50V,10%,10%,Y5P,DISC-RADI	
C903	55.5	209	2201-000288	C-CERAMIC,DISC	1nF,10%,2KV,Y5P,10x5mm,10mm,TP	⚠
CB101	157.2	108	2401-001509	(T)16V 47M	CAP-AL.ELEC,476M,1C,6.3X7MM	
CB102	158.3	119.3	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
CB103	164.2	108.1	2401-001509	(T)16V 47M	CAP-AL.ELEC,476M,1C,6.3X7MM	
CB104	135.4	121.8	2202-000321	C-CERAMIC,MLC-RADIAL	100nF,10%,50V,X7R,5.1x6.6,5.1	
CB105	137.5	135.2	2401-001509	(T)16V 47M	CAP-AL.ELEC,476M,1C,6.3X7MM	
CB106	138.4	140.7	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
CB107	150.1	225.5	2201-002060	C-CERAMIC,DISC	22pF,5%,500V,SL,TP,6.3x4,5	
CB108	135	171.5	2201-000502	C-CERAMIC,DISC	39pF,5%,50V,NPO,5x3.5,5,TP	
CB109	139.6	217.8	2305-000009	(T)250V 104J	CAP-MPETP,104J,2E,7.5P	
CB110	174.9	175.4	2202-000321	C-CERAMIC,MLC-RADIAL	100nF,10%,50V,X7R,5.1x6.6,5.1	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
CB112	205.9	226.2	2305-000009	(T)250V 104J	CAP-MPETP,104J ,2E,7.5P	
CB113	206.5	223.1	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
CB114	131.4	171.5	2202-000428	C-CERAMIC,MLC-RADIAL	220pF,5% ,100V,NPO,5.1x5.1x3.2	
CG101	134.8	108.1	2401-001509	(T)16V 47M	CAP-AL.ELEC,476M ,1C,6.3X7MM	
CG102	136	118.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
CG103	141.7	108	2401-001509	(T)16V 47M	CAP-AL.ELEC,476M ,1C,6.3X7MM	
CG104	117.7	122	2202-000321	C-CERAMIC,MLC-RADIAL	100nF,10% ,50V,X7R,5.1x6.6,5.1	
CG105	127.3	135.2	2401-001509	(T)16V 47M	CAP-AL.ELEC,476M ,1C,6.3X7MM	
CG106	117.2	140.8	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20% ,50V,Y5V,2.3X3.0	
CG107	129.9	224.5	2201-002060	C-CERAMIC,DISC	22pF,5% ,500V,SL,TP,6.3x4,5	
CG108	116.8	171.5	2201-000502	C-CERAMIC,DISC	39pF,5% ,50V,NPO,5x3.5,5,TP	
CG109	120.4	217.7	2305-000009	(T)250V 104J	CAP-MPETP,104J ,2E,7.5P	
CG110	171.2	175.4	2202-000321	C-CERAMIC,MLC-RADIAL	100nF,10% ,50V,X7R,5.1x6.6,5.1	
CG112	193.3	226.2	2305-000009	(T)250V 104J	CAP-MPETP,104J ,2E,7.5P	
CG113	193.5	223.1	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
CG114	113.1	171.5	2202-000428	C-CERAMIC,MLC-RADIAL	220pF,5% ,100V,NPO,5.1x5.1x3.2	
CN101	24.3	61	3710-001087	CONNECTOR-SOCKET	56P,2R,2.54mm,ANGLE,AUF	
CN102_B	142.5	230.6	3711-001031	CONNECTOR-HEADER	BOX,6P,1R,2.50mm,ANGLE,SN	
CN102RG	100.9	230.6	3711-000992	CONNECTOR-HEADER	BOX,5P,1R,2.50mm,ANGLE,SN	
CN103	83.8	137.6	3711-002658	CONNECTOR-HEADER	3WALL,4P,SN,2.5mm,STRAIGHT,SN	
CN104B	10.3	226.6	3711-000058	CONNECTOR-HEADER	BOX,4P,1R,2.5mm,ANGLE,SN	
CN104RG	62.7	226.5	3711-000058	CONNECTOR-HEADER	BOX,4P,1R,2.5mm,ANGLE,SN	
CN210	161.9	22	3711-001073	CONNECTOR-HEADER	BOX,6P,1R,2.50mm,ANGLE,SN	
CN211	161.9	7.8	3711-003259	CONNECTOR-HEADER	BOX,4P,1R,2.5mm,ANGLE,SN	
CN212	114.7	13.5	3711-003259	CONNECTOR-HEADER	BOX,4P,1R,2.5mm,ANGLE,SN	
CN801	10.4	138.1	3711-000058	CONNECTOR-HEADER	BOX,4P,1R,2.5mm,ANGLE,SN	
CNB	181	88	3705-000103	CONNECTOR-COAXIAL	CON-JACK BNC	
CND_SUB	123.4	64	3701-001018	CONNECTOR-DSUB	15P,3R,FEMALE,STRAIGHT,AU30	
CNG	157	88	3705-000103	CONNECTOR-COAXIAL	CON-JACK BNC	
CNH	157	64	3705-000103	CONNECTOR-COAXIAL	CON-JACK BNC	
CNR	133	88	3705-000103	CONNECTOR-COAXIAL	CON-JACK BNC	
CNV	181	64	3705-000103	CONNECTOR-COAXIAL	CON-JACK BNC	
CR101	110.2	108.1	2401-001509	(T)16V 47M	CAP-AL.ELEC,476M ,1C,6.3X7MM	
CR102	110.3	118.2	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
CR103	118.9	108.1	2401-001509	(T)16V 47M	CAP-AL.ELEC,476M ,1C,6.3X7MM	
CR104	110	122	2202-000321	C-CERAMIC,MLC-RADIAL	100nF,10% ,50V,X7R,5.1x6.6,5.1	
CR105	114.2	135.2	2401-001509	(T)16V 47M	CAP-AL.ELEC,476M ,1C,6.3X7MM	
CR106	107.3	139.3	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20% ,50V,Y5V,2.3X3.0	
CR107	111.3	224.5	2201-002060	C-CERAMIC,DISC	22pF,5% ,500V,SL,TP,6.3x4,5	
CR108	109.6	171.6	2201-000502	C-CERAMIC,DISC	39pF,5% ,50V,NPO,5x3.5,5,TP	
CR109	103.1	217.7	2305-000009	(T)250V 104J	CAP-MPETP,104J ,2E,7.5P	
CR110	167.3	175.4	2202-000321	C-CERAMIC,MLC-RADIAL	100nF,10% ,50V,X7R,5.1x6.6,5.1	
CR112	180	226.2	2305-000009	(T)250V 104J	CAP-MPETP,104J ,2E,7.5P	
CR113	180.6	223	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20% ,50V,Y5V,2.3X3.0	
CR114	106.1	171.5	2202-000428	C-CERAMIC,MLC-RADIAL	220pF,5% ,100V,NPO,5.1x5.1x3.2	
CRT1	106.1	171.5	BH03-10335V	CRT-COLOR	21,0.25,Dynamic,M51KYY101X07	
D101	49.4	109.7	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	

Loc.No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
D102	187.8	108	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D104	194.6	159.2	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D105	221.1	218	0402-000006	1000V,1A,1.1V,1A,2uS	DIODE-REC,1N4007GP,DO-41	
D106	225.1	229	0402-000006	1000V,1A,1.1V,1A,2uS	DIODE-REC,1N4007GP,DO-41	
D107	165.5	148.3	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D108	227.3	203.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D109	157.5	150.6	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D110	73.4	127.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
D211	113.8	20.8	0601-001047	LED	ROUND,GRN/YEL,2mm,585nm	
DB101	153.3	75.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DB102	145.3	78	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DB103	151	120.2	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DB104	166	93.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DB105	163.5	85.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DB106	165.8	119.3	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DB107	133.1	217.3	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DB108	135.7	225.3	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DB109	142.8	225.4	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DB110	200.7	202.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,BAV21,DO-35	
DG101	136.5	75.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DG102	128.5	78	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DG103	129.1	120	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DG104	145.5	93.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DG105	140.7	85.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DG106	142.8	120	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DG107	114.5	217.2	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DG108	117	225.2	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DG109	123.6	225.2	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DG110	198.2	202.8	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,BAV21,DO-35	
DR101	122.5	75.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DR102	114.5	78	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DR103	103.2	120.1	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DR104	122.5	93.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DR105	120	85.5	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DR106	117.7	119	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
DR107	97.3	217.2	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DR108	99.8	225.2	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DR109	106.1	225.2	0401-000006	250V,250MA,1V,100MA	DIODE-SIG,BAV21,DO-35	
DR110	174	204	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,BAV21,DO-35	
GTP903	31.8	236	BH71-40300A	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
HC02	92.8	46.5	2202-000841	C-CERAMIC,MLC-RADIAL	33nF,10%,100V,X7R,5x3.1,5,TP	
HC03	66.5	28.4	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
HCN01	76.2	46.6	3710-000192	CONNECTOR-SOCKET	4P,1R,2.5mm,ANGLE,SN	
HD01	94.3	41	0401-000005	75V,150MA,1V,10MA	DIODE-SIG,1N4148,DO-35	
HIC01	88.6	35.4	1202-000119	DIP,14,DUAL	IC-LIN,LM319,COMPARATOR	
HR01	71.6	47.1	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
HR02	66.5	47.1	2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
HR03	69.1	47.1	2001-000324	REF-CF,120,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
HR04	69.1	35.4	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
HR05	94.3	38.5	2001-000035	REF-CF,220,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
HR06	77.3	41.6	2001-000077	REF-CF,47K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
HR07	94.3	43.5	2001-000077	REF-CF,47K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
IC101	38.3	91.8	1103-001087	IC-EEPROM	24LC21A,128x8BIT,DIP,8P,300MIL	
IC102	72.3	90.8	0801-000337	IC-CMOS LOGIC	74HCT14,SCHIMITT INVERTER,DIP	
IC103	72.3	104.8	0801-000699	DIP,4,300MIL,QUAD	IC-MOS,74HC125,QUAD	
IC104	111.2	144.6	1201-001287	IC-VIDEO AMP	52748,DIP,36P,500MIL,TRIPLE	
IC105	104.1	190.1	BH13-10335P	IC-HYBRID	S-PROJECT,VPS14,ZIP,15P,CRT/DR	
IC106	183.4	145.9	1204-001322	IC-OSD PROCESSOR	LSC4350P2,DIP,24P,300MIL,PLAST	
IC107	183.5	182.1	1201-001242	IC-PREAMP	52324,DIP,18P,DUAL,PLASTIC	
IC108	210.7	120.4	BH13-10335H	IC-DYNAMIC FOCUS	S-PROJECT,M52723ASP,DIP,20P,DY	
IC801	61.2	142.6	1201-000434	IC-OP AMP	272,DIP,16P,DUAL,PLASTIC,2	⚠
IC802	59.8	121.5	1201-000434	IC-OP AMP	272,DIP,16P,DUAL,PLASTIC,2	⚠
L101	104.8	143.3	2701-000002	INDUCTOR-AXIAL	100uH,10%,4.2x9.8mm	
L102	187.1	121.8	2701-000125	INDUCTOR-AXIAL,150UH	FIX,150UH,10%,50,2.6X7MM	
L103	206.1	105.3	2701-000115	INDUCTOR-AXIAL	10uH,10%,2.8x7mm	
L104	200.8	116.5	2701-000115	INDUCTOR-AXIAL	10uH,10%,2.8x7mm	
L105	74.8	181.7	2701-000179	INDUCTOR-AXIAL	33uH,10%,4.2x9.8mm	
L106	98.1	177.7	2701-000115	INDUCTOR-AXIAL	10uH,10%,2.8x7mm	
LB901	17.4	225.8	2701-001011	INDUCTOR-AXIAL	220nH,10%,4.2x9.8mm	
LG901	46	226.2	2701-001011	INDUCTOR-AXIAL	220nH,10%,4.2x9.8mm	
LR901	57.2	225.9	2701-001011	INDUCTOR-AXIAL	220nH,10%,4.2x9.8mm	
Q101	93.1	109.4	0501-000586	0.25W,60V,50V,5V,0.15A	TR-NPN,KSC945,TO-92,EBC	
Q102	91.4	130.6	0501-000586	0.25W,60V,50V,5V,0.15A	TR-NPN,KSC945,TO-92,EBC	
Q103	223.1	202.7	0501-000122	0.625W,60V,40V,6V,0.2A	TR-NPN,2N3904,TO-92,EBC	
Q104	218.3	177.2	0501-000586	0.25W,60V,50V,5V,0.15A	TR-NPN,KSC945,TO-92,EBC	
Q105	190.2	165.4	0501-000122	0.625W,60V,40V,6V,0.2A	TR-NPN,2N3904,TO-92,EBC	
Q106	206.2	212.4	0501-000586	0.25W,60V,50V,5V,0.15A	TR-NPN,KSC945,TO-92,EBC	
Q107	197.2	108.9	0501-000483	TR-SMALL SIGNAL	KSP2222A,NPN,625mW,TO-92,TP,10	
Q108	231.7	188.7	0501-000492	TR-SMALL SIGNAL	MPS3646,NPN,625mW,TO-92,30-1	
Q109	156.3	144.4	0501-000581	TR-SMALL SIGNAL	2N3906,PNP,625mW,TO-92,TP,100-	
Q110	161.1	144.4	0501-000581	TR-SMALL SIGNAL	2N3906,PNP,625mW,TO-92,TP,100-	
Q111	166	144.4	0501-000581	TR-SMALL SIGNAL	2N3906,PNP,625mW,TO-92,TP,100-	
Q112	195.8	205.7	0501-000586	0.25W,60V,50V,5V,0.15A	TR-NPN,KSC945,TO-92,EBC	
QB101	153.9	117.2	0501-000621	TR-SMALL SIGNAL	2N5770,NPN,450mW,TO-92,TP	
QB102	162.1	117.2	0501-000621	TR-SMALL SIGNAL	2N5770,NPN,450mW,TO-92,TP	
QB104	187.2	205.7	0501-000412	0.625W,300V,300V,6V,0.5A	TR-NPN,MPSA42,TO-92,EBC	
QB105	201.4	222.4	0501-000416	300V,300V,5V,0.5A	TR-PNP,MPSA92,TO-92,EBC	
QG101	131.9	116.7	0501-000621	TR-SMALL SIGNAL	2N5770,NPN,450mW,TO-92,TP	
QG102	139.4	116.7	0501-000621	TR-SMALL SIGNAL	2N5770,NPN,450mW,TO-92,TP	
QG104	182	205.7	0501-000412	0.625W,300V,300V,6V,0.5A	TR-NPN,MPSA42,TO-92,EBC	
QG105	188.9	222.4	0501-000416	300V,300V,5V,0.5A	TR-PNP,MPSA92,TO-92,EBC	
QR101	106.3	116.7	0501-000621	TR-SMALL SIGNAL	2N5770,NPN,450mW,TO-92,TP	
QR102	113.7	116.7	0501-000621	TR-SMALL SIGNAL	2N5770,NPN,450mW,TO-92,TP	
QR104	176.9	205.7	0501-000412	0.625W,300V,300V,6V,0.5A	TR-NPN,MPSA42,TO-92,EBC	

Loc.No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
QR105	175.9	222.4	0501-000416	300V,300V,5V,0.5A	TR-PNP,MPSA92,TO-92,EBC	
R101	49.5	80.9	2001-000868	REF-CF,56,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R102	49.5	83.4	2001-000868	REF-CF,56,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R103	46.3	81.4	2001-000868	REF-CF,56,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R104	50.5	91.8	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R105	50.5	94.5	2001-000868	REF-CF,56,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R106	46.3	76.2	2001-000868	REF-CF,56,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R107	97.9	108.1	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R108	89.7	115.6	2001-000072	REF-CF,22K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R109	95.3	127.8	2001-000072	REF-CF,22K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R110	100.6	108.1	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R111	109.1	85.4	2001-000553	R-CARBON	270ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R112	109.1	80.4	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R113	101.1	95.8	2001-000553	R-CARBON	270ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R114	101.1	90.8	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R115	100.2	139.8	2001-000301	REF-CF,10,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R116	146.1	136.1	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R117	108.2	158.3	2001-000028	R-CARBON(S)	100ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R118	100.9	147.3	2001-001129	R-CARBON(S)	330Kohm,5%,1/2W,AA,TP,2.4x6.4m	
R119	98.1	158.3	2004-000657	R-METAL	27Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
R120	148.2	163.5	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R121	148.2	160.8	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R122	76.2	138.2	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R123	229.9	203.8	2001-000104	R-CARBON	1.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R124	220	191.8	2001-000062	R-CARBON	470ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R125	222.6	170.2	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R126	216.3	188.5	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R127	226.3	181.7	2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R128	197.3	166	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R129	182.6	166.2	2001-000057	REF-CF,5.1K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R130	159.6	127.2	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R133	171.8	160.8	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R134	171.8	163.5	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R135	185.1	135.3	2001-000059	REF-CF,5.6K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R136	187.6	141.8	2001-000106	R-CARBON	1.5Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R137	194	135.3	2001-000046	R-CARBON	1.8Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R138	186.7	132.5	2001-000097	R-CARBON	1Mohm,5%,1/6W,AA,TP,1.8x3.2mm	
R139	205.4	202.7	2001-000108	R-CARBON	18Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R140	211.6	196.2	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R141	227.9	206.8	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R142	207.6	192.4	2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R143	210.8	213.5	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R144	222.7	206.8	2001-000097	R-CARBON	1Mohm,5%,1/6W,AA,TP,1.8x3.2mm	
R145	216.3	218	2003-000534	R-METAL OXIDE(S)	1Kohm,5%,1W,AA,TP,3.3x9mm	
R146	149.6	177.1	2001-000086	R-CARBON	100Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R147	210.9	182.4	2001-000089	REF-CF,150K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIA	
R148	210.9	179.7	2001-000064	REF-CF,7.5K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
R149	179.1	195.1	2004-000150	R-METAL	1.5Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R153	123.5	111	2001-000041	R-CARBON	820ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R154	125.9	126.8	2001-000086	R-CARBON	100Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R155	68.5	152.2	2003-000422	R-METAL OXIDE(S)	1.2ohm,5%,2W,AA,TP,4x12mm	
R156	73.7	132.2	2003-000422	R-METAL OXIDE(S)	1.2ohm,5%,2W,AA,TP,4x12mm	
R157	191.2	205.7	2001-000043	REF-CF,10,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R159	162.1	135.2	2001-000046	R-CARBON	1.8Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R160	152.5	143.1	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R161	227.7	177.2	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R162	230.3	166.2	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R163	223.6	149.9	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R164	229	149.9	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R165	228.8	188.7	2001-000877	R-CARBON	6.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R166	235.6	188.8	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R167	218.7	188.5	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R168	147.4	151.2	2001-000026	R-CARBON	75ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R170	220.5	132.3	2001-000067	REF-CF,10K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R171	194	75.1	2001-000035	REF-CF,220,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R172	194.2	110.4	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R173	203.3	111.3	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R174	210.4	139.3	2001-000053	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R175	217.3	109.8	2001-000064	REF-CF,7.5K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R176	225.9	109.8	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R177	191.3	110.4	2001-000067	REF-CF,3.3K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R180	223.2	132.3	2004-001136	R-METAL	6.8Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R181	200.8	111.3	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R182	217.3	100.1	2001-000057	REF-CF,5.1K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R183	214.4	132.3	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R190	196.7	75.1	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R191	49.5	78.3	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R192	46.3	78.8	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R193	81.1	241.4	2003-000471	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R195	91	82.8	2001-000211	R-CARBON	1ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R196	122.3	130.1	2001-003105	R-CARBON	1ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R197	97.7	125.5	2001-003105	R-CARBON	1ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R261	181.3	43.9	2001-000059	REF-CF,5.6K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R262	170.3	41.4	2001-000715	R-CARBON	3Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R263	181.3	34.2	2001-000069	R-CARBON	12Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R264	170.3	36.7	2001-000059	REF-CF,5.6K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R265	181.3	31.7	2001-000715	R-CARBON	3Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R266	167.6	20.7	2001-000104	R-CARBON	1.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R267	178.6	23.4	2001-000104	R-CARBON	1.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R268	178.6	13.7	2001-000069	R-CARBON	12Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R801	66.3	139.3	2001-000836	R-CARBON	51Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R802	29.2	146.7	2001-000075	REF-CF,39K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R803	35.7	144.2	2001-000715	R-CARBON	3Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R804	44	149.4	2001-000074	REF-CF,33K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
R805	35.7	141.8	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R806	25	138.1	2003-000455	REF-M O,100,5%,2W(S)	500V,-200 TO +200PPM/C,R-AXIAL	
R807	25	144.2	2003-000455	REF-M O,100,5%,2W(S)	500V,-200 TO +200PPM/C,R-AXIAL	
R808	65.5	129.9	2001-000836	R-CARBON	51Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R809	29.2	137.5	2001-000075	REF-CF,39K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
R810	31.8	135.1	2001-000046	R-CARBON	1.8Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R811	42.2	129.5	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R812	31.8	131.1	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R813	21.1	128.4	2003-000455	REF-M O,100,5%,2W(S)	500V,-200 TO +200PPM/C,R-AXIAL	
R814	21.1	133.2	2003-000455	REF-M O,100,5%,2W(S)	500V,-200 TO +200PPM/C,R-AXIAL	
R815	214	155.3	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
R816	216.5	155.3	2001-000043	REF-CF,1K,5%,1/6W	150V,-1300 TO +350PPM,R-AXIAL	
RB101	142.3	72.6	2004-001235	REF-M F,75,1%,1/4W	250V,-100 TO +100PPM/C,R-AXIAL	
RB102	150.6	102	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RB103	153	108.5	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RB104	148.3	111.2	2001-000027	REF-CF,100,5%,1/4W	250V,-350 TO +350PPM/C,R-AXIAL	
RB105	171.4	108.1	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RB106	168.5	82.5	2004-001235	REF-M F,75,1%,1/4W	250V,-100 TO +100PPM/C,R-AXIAL	
RB107	145.5	111.2	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RB108	125.3	162.9	2001-000040	R-CARBON	470ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RB109	145.2	217.5	2001-000104	R-CARBON	1.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
RB110	129.3	175.1	2001-000026	R-CARBON	75ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RB111	135.5	186.1	2001-000831	R-CARBON	510ohm,5%,1/4W,AA,TP,2.4x6.4mm	
RB112	157.6	158.1	2001-000026	R-CARBON	75ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RB113	149.6	169.5	2001-000086	R-CARBON	100Kohm,5%,1/6W,AA,TP,1.8x3.2m	
RB114	137.3	195.5	2001-000020	R-CARBON(S)	22ohm,5%,1/2W,AA,TP,2.4x6.4mm	
RB115	202.1	178.1	2001-000089	REF-CF,150K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIA	
RB116	201.8	241.4	2001-000686	R-CARBON	390Kohm,5%,1/2W,AA,TP,3.3x9mm	
RB117	198.8	222.7	2001-000891	R-CARBON	6.8M ohm,5%,1/4W,AA,TP,2.4x6.4m	
RB119	137.8	241.4	2001-000530	REF-CF,240K,5%,1/4W	250V,-1000 TO -500PPM/C,R-AXIAL	
RB120	209.2	216.1	2001-000074	REF-CF,33K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RB121	168.9	101.6	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RB122	132.7	186.1	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RB901	24	241.1	2002-001001	R-COM POSITION	22ohm,10%,1/2W,AA,TP,3.5x9.5mm	
RG101	125.5	72.5	2004-001235	REF-M F,75,1%,1/4W	250V,-100 TO +100PPM/C,R-AXIAL	
RG102	128.3	101.6	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RG103	130.6	108.1	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RG104	126.7	111.1	2001-000027	REF-CF,100,5%,1/4W	250V,-350 TO +350PPM/C,R-AXIAL	
RG105	148.2	108.5	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RG106	148.5	82.5	2004-001235	REF-M F,75,1%,1/4W	250V,-100 TO +100PPM/C,R-AXIAL	
RG107	120.3	112	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RG108	116	162.2	2001-000040	R-CARBON	470ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RG109	127.2	217.3	2001-000104	R-CARBON	1.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
RG110	121.9	175.1	2001-000026	R-CARBON	75ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RG111	117.5	186.1	2001-000831	R-CARBON	510ohm,5%,1/4W,AA,TP,2.4x6.4mm	
RG112	157.6	155.6	2001-000026	R-CARBON	75ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RG113	149.6	172	2001-000086	R-CARBON	100Kohm,5%,1/6W,AA,TP,1.8x3.2m	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
RG114	117	195.5	2001-000020	R-CARBON(S)	22ohm,5%,1/2W,AA,TP,2.4x6.4mm	
RG115	194.6	178.1	2001-000089	REF-CF,150K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIA	
RG116	189.4	241.4	2001-000686	R-CARBON	390Kohm,5%,1/2W,AA,TP,3.3x9mm	
RG117	186.2	222.7	2001-000891	R-CARBON	6.8M ohm,5%,1/4W,AA,TP,2.4x6.4m	
RG119	115.2	241.4	2001-000530	REF-CF,240K,5%,1/4W	250V,-1000 TO -500PPM/C,R-AXIAL	
RG120	196.1	216.1	2001-000074	REF-CF,33K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RG121	145.8	102	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RG122	114.9	186.1	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RG901	39.3	241.2	2002-001001	R-COMPOSITION	22ohm,10%,1/2W,AA,TP,3.5x9.5mm	
RR101	111.5	72.5	2004-001235	REF-MF,75,1%,1/4W	250V,-100 TO +100PPM/C,R-AXIAL	
RR102	103.1	101.6	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RR103	105.7	108.1	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RR104	98	111	2001-000027	REF-CF,100,5%,1/4W	250V,-350 TO +350PPM/C,R-AXIAL	
RR105	125.9	108.1	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RR106	125	82.5	2004-001235	REF-MF,75,1%,1/4W	250V,-100 TO +100PPM/C,R-AXIAL	
RR107	100.7	111	2001-000029	REF-CF,100,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RR108	106.8	162.3	2001-000040	R-CARBON	470ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RR109	108.5	217.2	2001-000104	R-CARBON	1.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
RR110	105.2	175.1	2001-000026	R-CARBON	75ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RR111	110.6	186.1	2001-000831	R-CARBON	510ohm,5%,1/4W,AA,TP,2.4x6.4mm	
RR112	157.7	153.1	2001-000026	R-CARBON	75ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RR113	149.6	174.5	2001-000086	R-CARBON	100Kohm,5%,1/6W,AA,TP,1.8x3.2m	
RR114	111.5	195.5	2001-000020	R-CARBON(S)	22ohm,5%,1/2W,AA,TP,2.4x6.4mm	
RR115	188.1	178.1	2001-000089	REF-CF,150K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIA	
RR116	175.9	241.4	2001-000686	R-CARBON	390Kohm,5%,1/2W,AA,TP,3.3x9mm	
RR117	172.5	222.7	2001-000891	R-CARBON	6.8M ohm,5%,1/4W,AA,TP,2.4x6.4m	
RR119	97	241.4	2001-000530	REF-CF,240K,5%,1/4W	250V,-1000 TO -500PPM/C,R-AXIAL	
RR120	183.2	216	2001-000074	REF-CF,33K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RR121	123.5	101.6	2001-000048	REF-CF,2.2K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RR122	107.9	186.1	2001-000056	REF-CF,4.7K,5%,1/6W	150V,-1300 TO +350PPM/C,R-AXIAL	
RR901	52.9	241.2	2002-001001	R-COMPOSITION	22ohm,10%,1/2W,AA,TP,3.5x9.5mm	
SG901	49.5	226.2	4715-000106	SPARK-GAP	DSP-301N	
SG902	42.6	226.2	4715-000106	SPARK-GAP	DSP-301N	
SG903	20.9	226	4715-000106	SPARK-GAP	DSP-301N	
SG904	9.3	219.5	4715-000106	SPARK-GAP	DSP-301N	
SG905	52.5	221	4715-000001	SPARK-GAP	S-23(1KV),5MM	
SK101	32.5	208	3704-001032	SOCKET-CRT	8P,29PI,35.5PI,AU30U	
SW201	203	44.5	3404-000243	SWITCH-TACT,2P,665MM	15VDC,20MA,SPST,160G,0.25	
SW202	222	44.5	3404-000243	SWITCH-TACT,2P,665MM	15VDC,20MA,SPST,160G,0.25	
SW203	201	23.5	3404-000243	SWITCH-TACT,2P,665MM	15VDC,20MA,SPST,160G,0.25	
SW204	224	23.5	3404-000243	SWITCH-TACT,2P,665MM	15VDC,20MA,SPST,160G,0.25	
SW205	212.5	35	3404-000243	SWITCH-TACT,2P,665MM	15VDC,20MA,SPST,160G,0.25	
SW206	212.5	12	3404-000243	SWITCH-TACT,2P,665MM	15VDC,20MA,SPST,160G,0.25	
SW207	109.7	35.7	3404-000243	SWITCH-TACT,2P,665MM	15VDC,20MA,SPST,160G,0.25	
ZD101	57.5	85.9	0403-000007	DIODE-ZENER	UZ6.2BM,6.2V,6.0-6.4V,500mW,DO	
ZD102	38.3	73.5	0403-000007	DIODE-ZENER	UZ6.2BM,6.2V,6.0-6.4V,500mW,DO	
ZD103	49.5	75.4	0403-000508	DIODE-ZENER	BZX79C5V6,5.6V,5%,500mW,DO-35	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
ZD104	101.1	82.8	0403-000508	DIODE-ZENER	BZX79C5V6,5.6V,5%,500mW,DO-35	
ZD105	101.1	78	0403-000508	DIODE-ZENER	BZX79C5V6,5.6V,5%,500mW,DO-35	
ZD106	101.1	93.3	0403-000508	DIODE-ZENER	BZX79C5V6,5.6V,5%,500mW,DO-35	
ZD107	101.1	88.1	0403-000508	DIODE-ZENER	BZX79C5V6,5.6V,5%,500mW,DO-35	
ZD112	87.9	148.4	0403-000508	DIODE-ZENER	BZX79C5V6,5.6V,5%,500mW,DO-35	

Others

Loc. No.	Code No.	Description	Specification	Remarks
CRT	BH03-10339Y	CRT-COLOR	21",0.28,M51LEQ183X96FU	⚠
CRT GND	BH39-40365S	CBF-HARNESS	1P,410MM,BLK,UL1015/8*0.16TA*1	
D-COIL	BH27-10336E	COIL-DEGAUSSING	460*370*2650MM,10.5MH,10.8OHM	
PROCESS-PBA UNIT	BH94-30008H	ASS'Y,PCB	CGP1607L	
B/D ASS'Y CODE	BH98-10008H	ASS'Y,PCB-MAIN	CGP1607L	
	BH98-20003X	ASS'Y,PCB-VIDEO	CGP1607L	
	BH98-30001D	ASS'Y,PCB-POWER	CGP1607L	
P/CORD	BH94-40001B	ASS'Y,P/CORD	GERMANY,250V/6A,1830,IVORY,DET	
	BH94-40001F	ASS'Y,P/CORD	CHINA,250V/10A,1830,BLK,DET	
	BH94-40001W	ASS'Y,P/CORD	AUSTRALIA,250V/10A,1830,IVY	
	BH94-40001Y	ASS'Y,P/CORD	UK,250V/10A,1230,IVY,DET,H05VV	
SIGNAL CABLE	BH94-50001E	ASS'Y,S/CABLE	SAMSUNG,1830,15P/15P	

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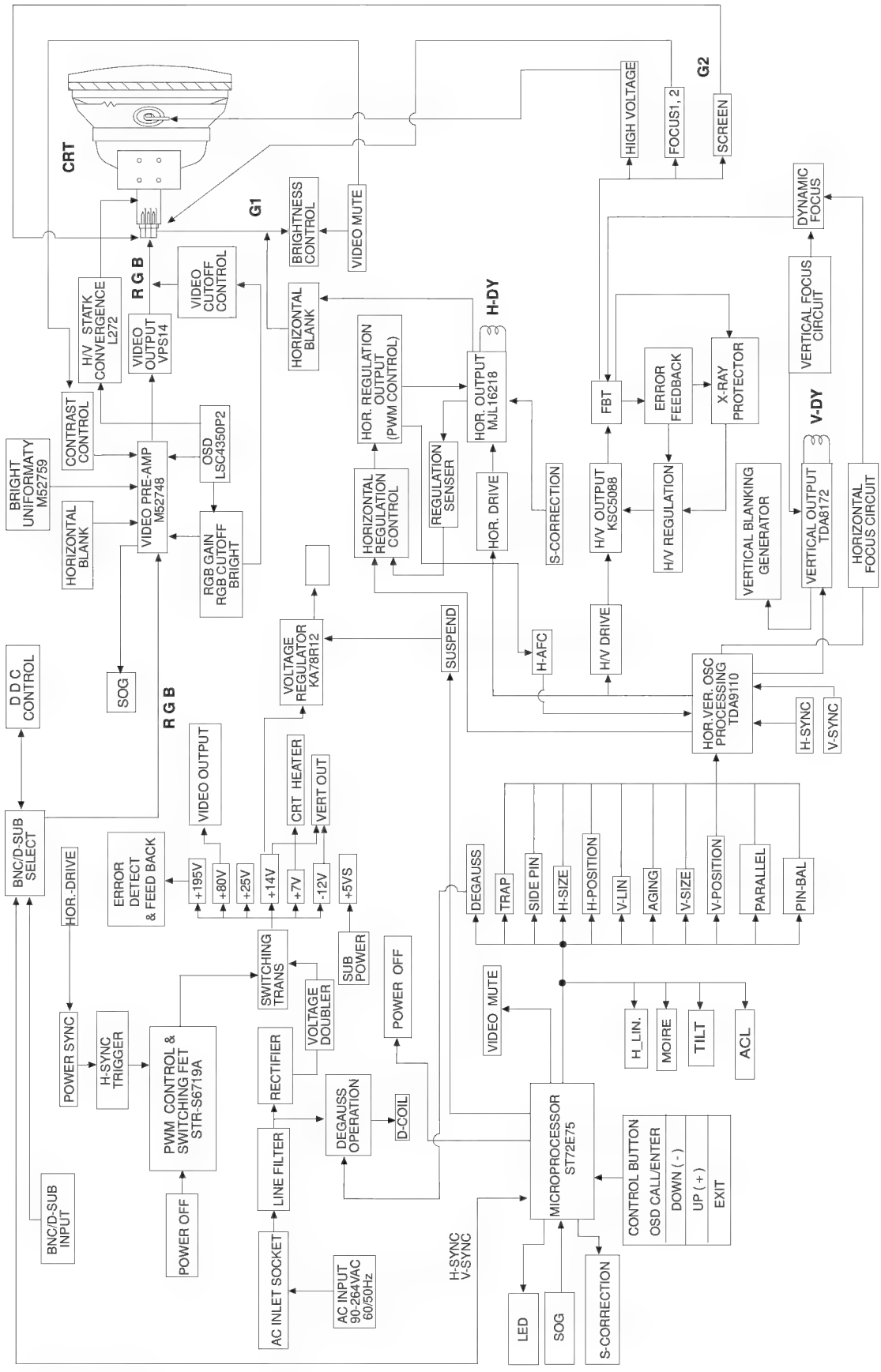
10 Block Diagram



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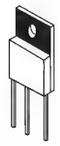
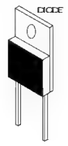
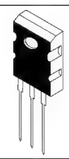
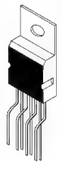
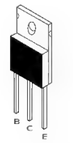
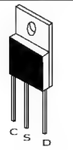
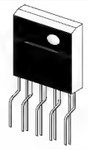
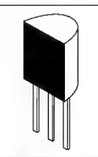
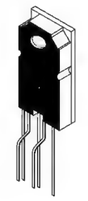
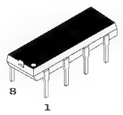
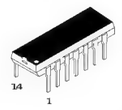
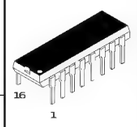
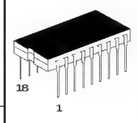
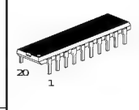
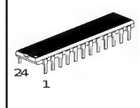
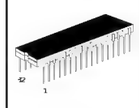
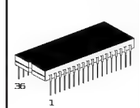
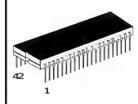
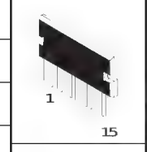
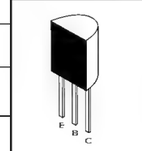
11 PCB Diagrams

11-1 Semiconductor Lead Identification

PARTS	TYPE NO.	REF. NO.
	PBS606G	D601
	FMP-G2FS	D502
	KSC5088	Q502
	MUR10150E	D413
	KSC5042M	Q507
	MJL16218	Q407
	KA431	IC502, IC603, IC604, IC702
	TDA2006 TDA8172	IC402 IC301

PARTS	TYPE NO.	REF. NO.
	KSD401-Y TIP29 TIP30	Q603 Q510 Q509
	KA78R12	IC405
	TOP221Y	IC701
	IRF740A IRF640A IRF630A IRF610A	Q405, Q503 Q408, Q409, Q410 Q411, Q412 Q406, Q501
	STR-S6719A	IC601
	KIA7045P	IC202, IC605
	ZVN3310A	Q604
	STR81145	IC606

PARTS	TYPE NO.	REF. NO.
	LTV-817M-SH	CP602, CP603, CP701
	24LC21A	IC101
	KA3843B	IC401
	24LC08B	IC203
	L272M	IC404
	KA358	IC503
	MC74HC125AN	IC103
	74HCT14N	IC102
	KA319	HIC01
	TL494 L272	IC501 IC801, IC802
	M52324P	IC107
	M52759SP	IC108
	LXC4350P2	IC106
	TDA9110	IC403
	M52748SP	IC104

PARTS	TYPE NO.	REF. NO.
	72E75	IC201
	VPS14	IC105
	2N3904	Q103, Q105, Q201, Q202, Q402, Q403, Q419
	KSP92	QR105,QG105, QB105
	KSC1008	Q601
	2N5551	Q508
	KSP2222A	Q107, Q505, Q602, Q608
	2N5770	QR101, QR102, QG101, QG102, QB101, QB102
	KSP2907	Q609
	KSP42	QB104, QG104, QR104
	KSA733	Q401, Q416, Q504, Q506, Q606
	KSC945	Q101, Q102, Q104, Q106, Q112, Q204, Q414, Q415, Q417, Q511, Q512, Q513, Q514, Q607
	MPS3646	Q108

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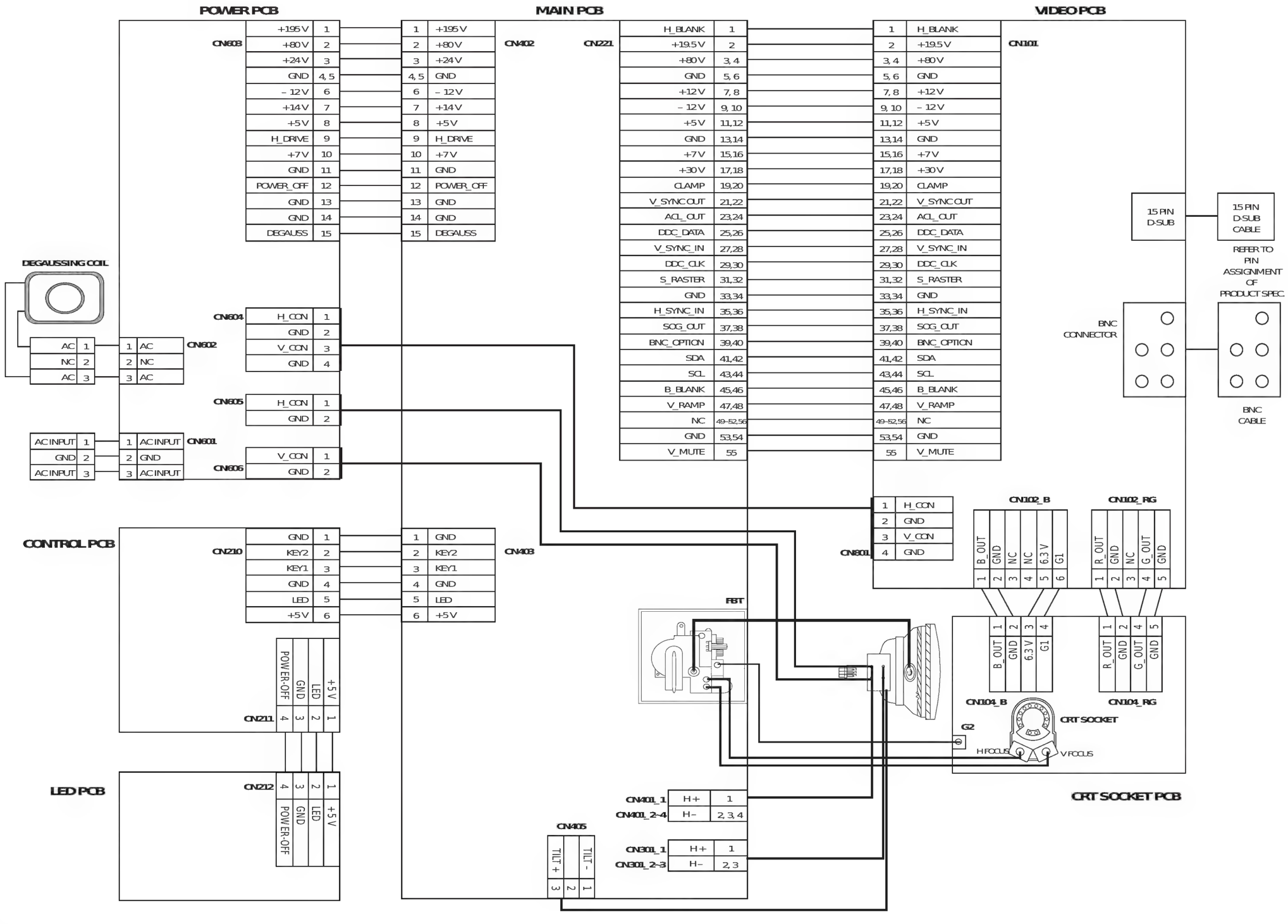
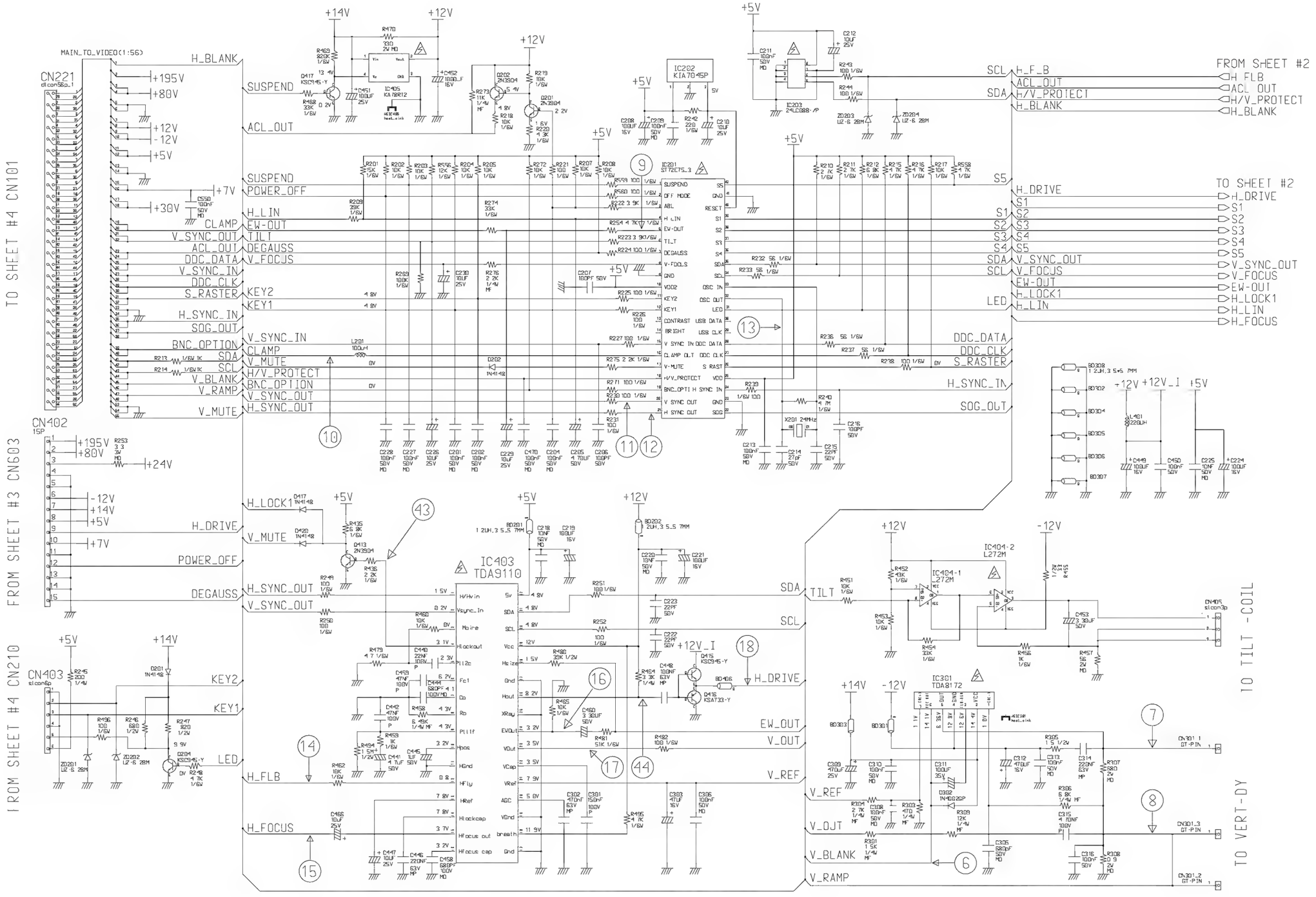
12 Wiring Diagram

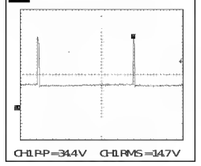


13 Schematic Diagrams

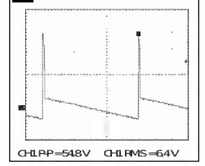
13-1 Micom & H/V Processor Part Schematic Diagram



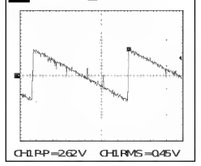
6 34.4 V (IC301, #6))



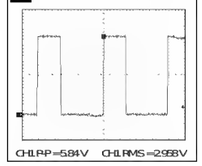
7 54.8 V (IC301, #5)



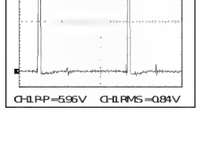
8 2.62 V (V_RAMP)



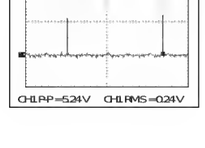
9 5.84 V (IC201, #5))



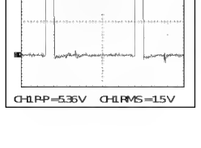
10 5.96 V (IC201, CLAMP)



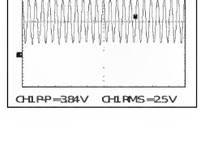
11 5.24 V (IC201, #20)



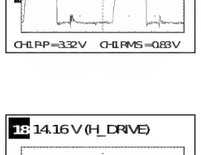
12 5.36 V (IC201, #21))



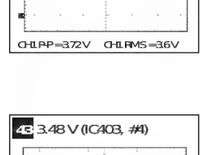
13 3.84 V (IC201, #32)



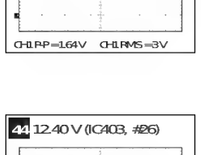
14 3.32 V (IC403, #12)



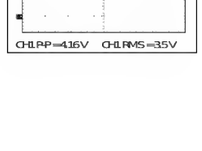
15 3.72 V (IC403, #15)



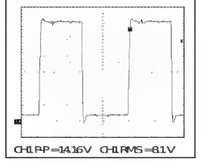
16 1.64 V (IC403, #24)



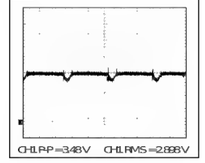
17 4.16 V (IC403, #23)



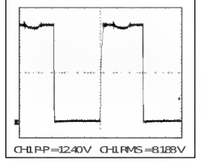
18 14.16 V (H_DRIVE)



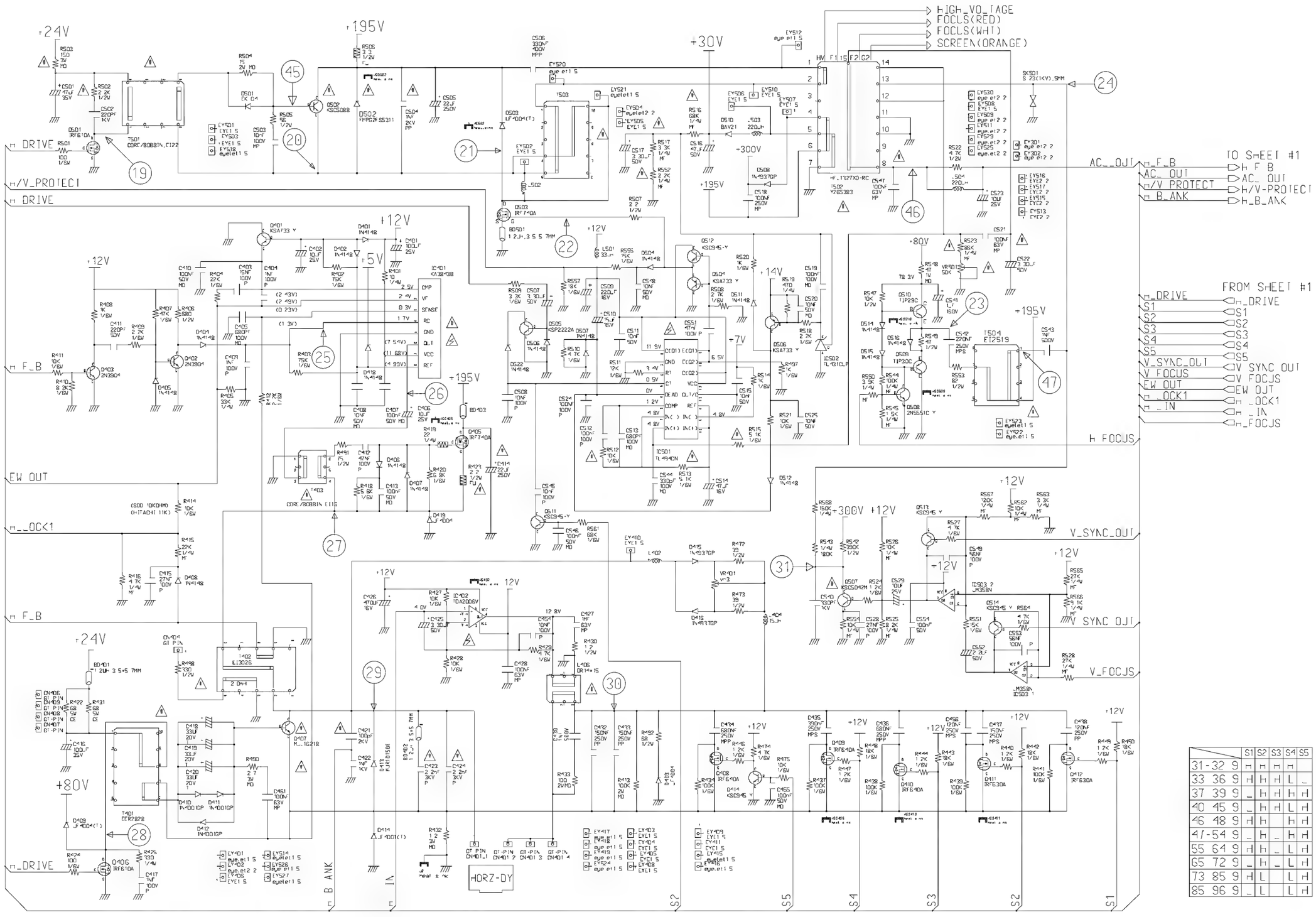
43 3.48 V (IC403, #4)



44 12.40 V (IC403, #26)



13-2 Deflection Part Schematic Diagram



	S1	S2	S3	S4	S5
31-32 9	H	H	H	H	
33 36 9	H	H	H	L	L
37 39 9	L	H	H	H	H
40 45 9	L	H	H	L	H
46 48 9	H	H		H	H
41-54 9	L	H	L	H	H
55 64 9	H	H	L	L	H
65 72 9	L	H	L	L	H
73 85 9	H	L		L	H
85 96 9	L	L		L	H

Table 13-1. IC201 (ST72E75)

pin #	MODES			pin #	MODES		
	31.1kHz	68kHz	96kHz		31.1kHz	68kHz	96kHz
1	0.25	0.25	0.25	22	4.00	3.70	3.77
2	0.25	0.25	0.25	23	GND	GND	GND
3	0.91	1.38	1.37	24	3.85	0.32	4.03
4	0.76	3.10	4.47	25	4.95	4.95	4.95
5	2.70	3.08	3.08	26	0	0	0
6	2.56	2.50	2.50	27	4.95	4.94	4.94
7	0.25	0.25	0.25	28	4.95	4.94	4.94
8	4.93	4.93	4.93	29	4.95	4.94	4.94
9	GND	GND	GND	30	4.95	4.93	4.93
10	4.96	4.94	4.94	31	0.06	0.06	0.06
11	4.95	4.94	4.94	32	2.28	2.28	2.28
12	4.95	4.95	4.95	33	2.21	2.21	2.21
13	NC	NC	NC	34	4.91	4.91	4.91
14	NC	NC	NC	35	4.92	4.92	4.92
15	4.35	0	0	36	12.01	0.06	0.06
16	0.11	0.12	0.17	37	12.01	0.06	0.06
17	0	0	0	38	9.65	9.66	0.06
18	4.99	4.98	4.84	39	12.01	0.06	0.06
19	4.95	4.95	4.95	40	4.96	4.96	4.96
20	0.02	0	0	41	GND	0	0
21	0.59	0.36	0.38	42	5.08	4.74	4.74

Unit: Vrms

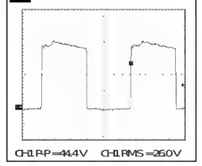
11; Right: 3.4 V, Left: 2.5 V, Down: 1.5 V, Up: 0.7 V
12; S/W: 3.2 V, Menu: 2.4 V, Exit: 1.4 V

Table 13-2. IC403 (TDA9110)

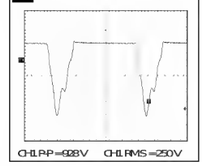
pin #	MODES			pin #	MODES		
	31.1kHz	68kHz	96kHz		31.1kHz	68kHz	96kHz
1	0.59	0.36	0.38	17	GND	0	0
2	0.03	0.02	0.02	18	12.03	12.03	12.03
3	0.09	0.09	0.09	19	GND	0	0
4	3.28	3.26	3.26	20	5.38	5.16	5.12
5	3.20	2.51	2.16	21	8.04	8.04	8.04
6	6.33	6.32	6.32	22	3.50	3.50	3.50
7	3.97	3.95	3.94	23	3.55	3.52	3.51
8	1.52	3.34	4.72	24	3.10	3.11	3.11
9	1.52	3.34	4.72	25	0	0	0
10	3.41	3.16	3.16	26	5.79	5.68	5.60
11	GND	GND	GND	27	GND	0	0
12	–0.04	–0.12	–0.22	28	1.64	0.84	0.65
13	7.94	7.94	7.94	29	12.03	12.03	12.03
14	7.98	7.92	7.89	30	4.91	4.91	4.91
15	3.14	2.78	3.3	31	4.91	4.91	4.91
16	3.26	3.23	3.22	32	4.95	4.95	4.95

Unit: Vrms

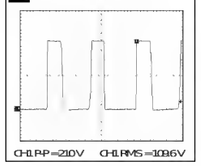
19 44.4 V (Q501, Drain)



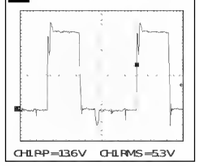
20 9.28 V (Q502, Emitter)



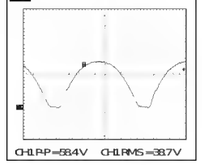
21 21.0 V (Q503, Drain)



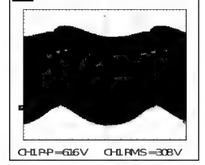
22 13.6 V (Q503, Gate)



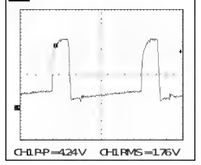
23 58.4 V (Q510, Emitter)



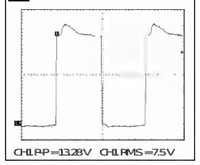
24 61.6 V (T502, FOCUS #13)



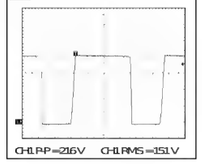
25 4.24 V (IC401, #4)



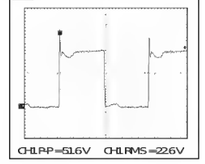
26 13.28 V (IC401, #6)



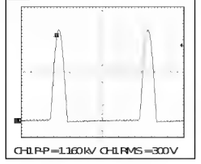
27 21.6 V (T402, #6)



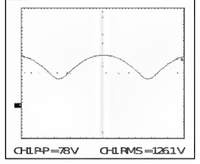
28 51.6 V (Q406, Drain)



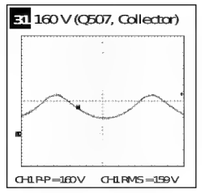
29 1.160 kV (Q407, Collector)



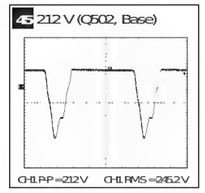
30 78 V (L406, #8)



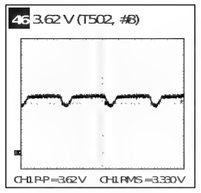
31 160 V (Q507, Collector)



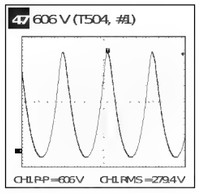
45 21.2 V (Q502, Base)



46 3.62 V (T502, #8)



47 606 V (T504, #1)



13-3 Power Part Schematic Diagram

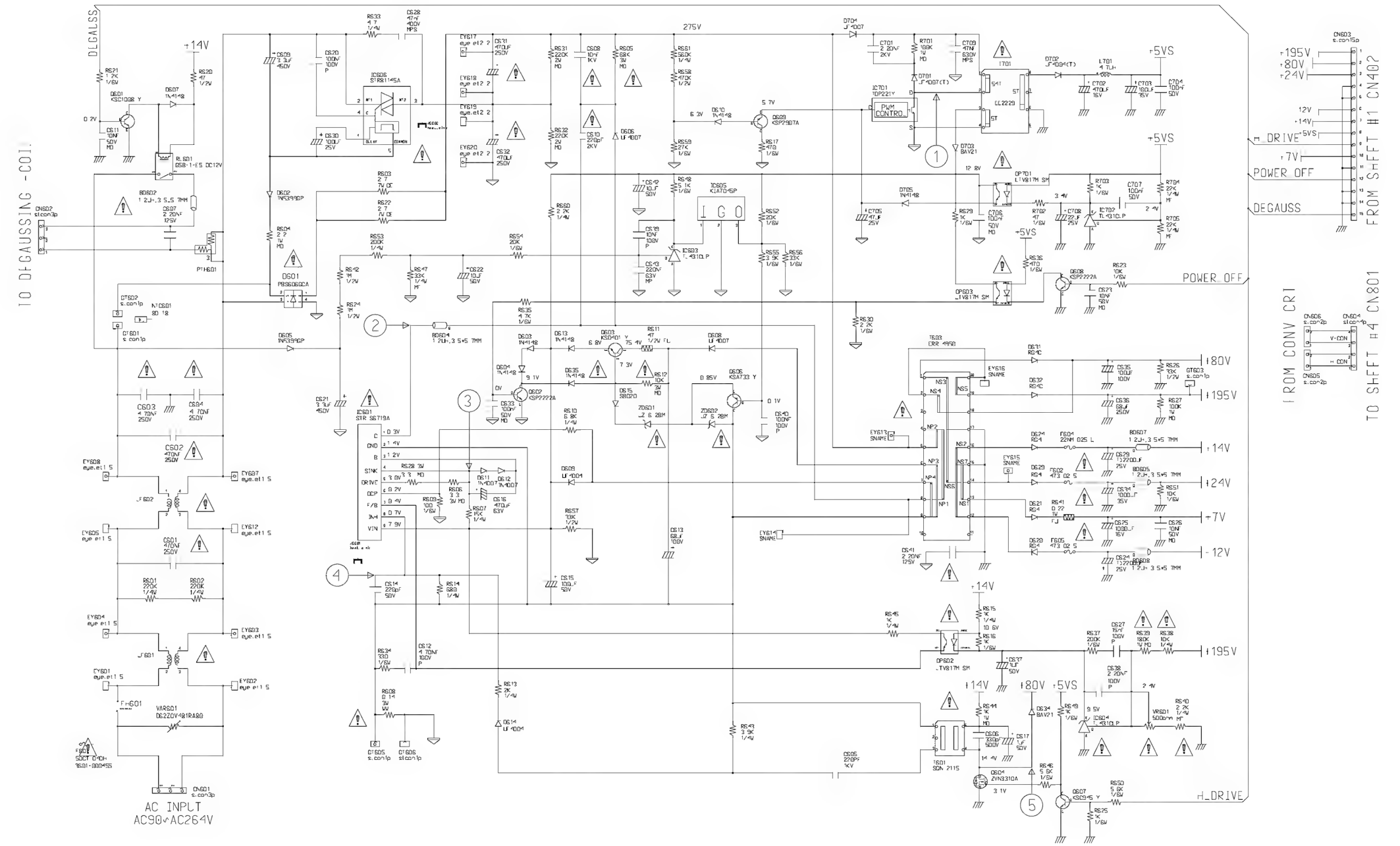


Table 13-3. IC401 (KA3843B)

pin #	MODES		
	31.1kHz	68.1kHz	93.1kHz
1	3.78	3.03	2.81
2	2.49	2.49	2.49
3	0.87	0.51	0.32
4	1.59	1.42	1.49
5	GND	GND	GND
6	2.30	4.61	6.29
7	11.85	11.85	11.85
8	4.96	4.96	4.96

Unit: Vrms

Table 13-4. IC402 (TDA2006)

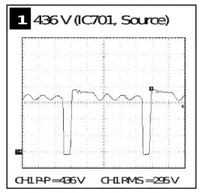
pin #	MODES		
	31.1kHz	68.1kHz	96.1kHz
1	0.76	3.09	4.45
2	0.76	3.10	4.47
3	-12.04	-12.49	-12.49
4	-4.11	0.41	3.05
5	12.03	12.03	12.03

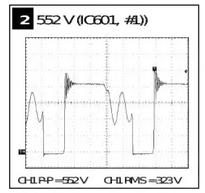
Unit: Vrms

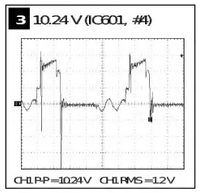
Table 13-5. IC501 (TL494)

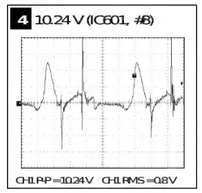
pin #	MODES		
	31.1kHz	68.1kHz	96.1kHz
1	4.92	4.92	4.92
2	4.92	4.92	4.92
3	1.48	1.35	1.31
4	0	0	0
5	0.01	0.63	0.61
6	3.51	3.51	3.51
7	GND	GND	GND
8	12.00	12.00	12.00
9	3.19	4.03	4.67
10	3.19	4.03	4.67
11	12.00	12.00	12.00
12	12.00	12.00	12.00
13	GND	GND	GND
14	4.92	4.92	4.92
15	7.03	7.15	7.20
16	4.92	4.92	4.92

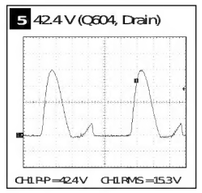
Unit: Vrms











13-4 Video & CRT & Convergence & Key Part Schematic Diagram

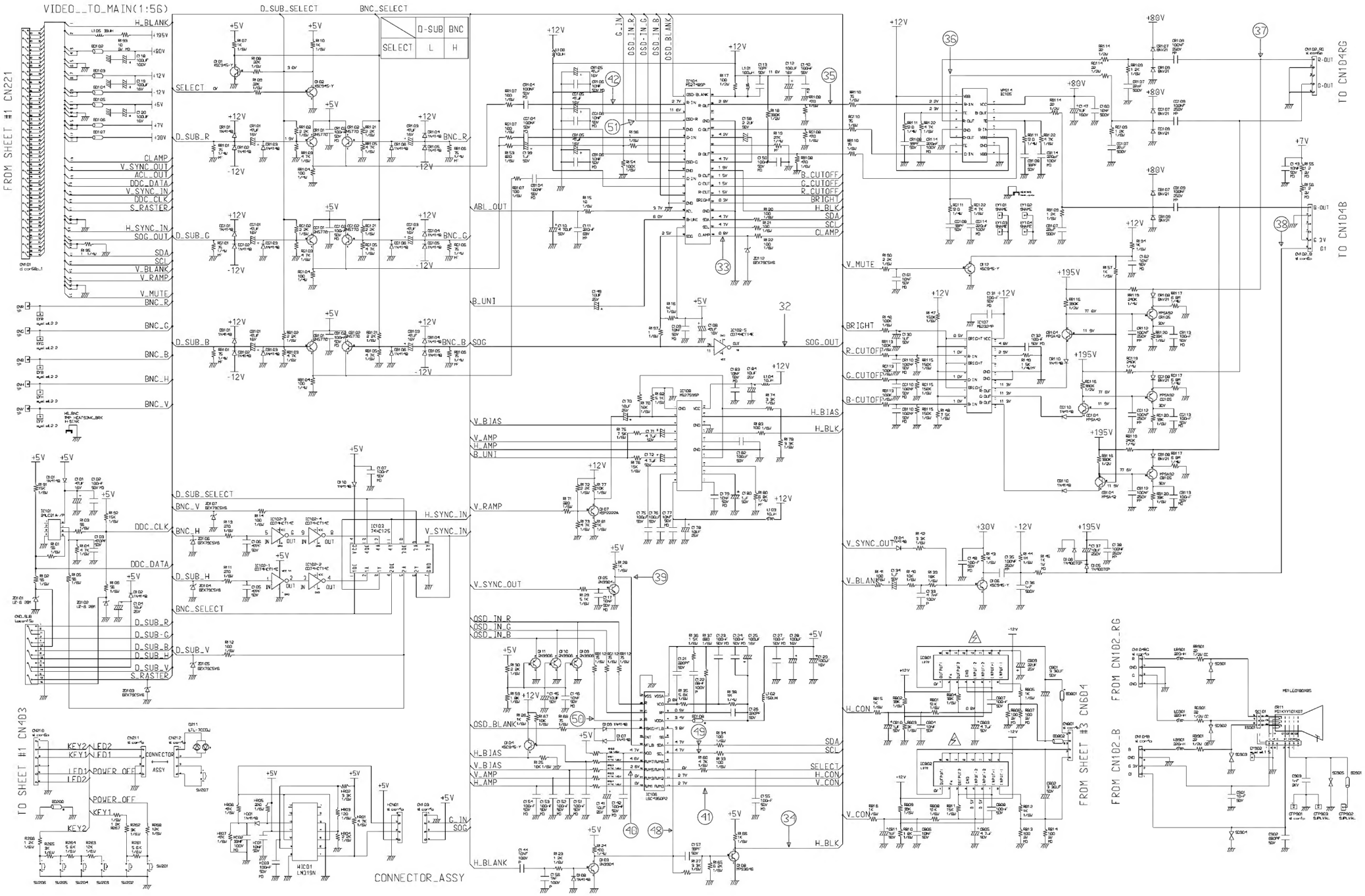


Table 13-6. IC301 (TDA8172)

pin #	MODES		
	31.1kHz	68.1kHz	96.1kHz
1	1.19	1.19	1.19
2	14.85	14.91	14.91
3	-11.67	-11.73	-11.67
4	-12.10	-12.32	-12.33
5	0.01	0.12	0.07
6	14.45	14.63	14.68
7	1.19	1.19	1.19

Unit: Vrms

Table 13-7. IC106 (LSC4850P2)

pin #	MODES			pin #	MODES		
	31.1kHz	68.1kHz	96.1kHz		31.1kHz	68.1kHz	96.1kHz
1	0.24	0.34	0.45	13	0	0	0
2	0.55	0.71	1.00	14	0	0	0
3	0.55	0.71	1.00	15	2.12	2.09	2.07
4	4.90	4.89	4.88	16	4.25	4.17	4.08
5	4.13	3.82	3.59	17	4.89	4.85	4.83
6	NC	NC	NC	18	4.90	4.89	4.89
7	4.91	4.91	4.91	19	NC	NC	NC
8	4.91	4.91	4.91	20	0.42	0.42	0
9	NC	NC	NC	21	0	0	0
10	0	0	0	22	0	0	0
11	2.31	2.30	2.29	23	0	0	0
12	2.31	2.29	2.28	24	GND	0	0

Unit: Vrms

Table 13-8. IC107 (M52324P)

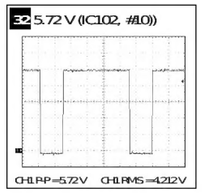
pin #	MODES		
	31.1kHz	68.1kHz	96.1kHz
1	0.42	0.42	0.42
2	0.56	0.56	0.56
3	0.97	0.97	0.97
4	0.42	0.42	0.42
5	0.56	0.56	0.56
6	0.96	0.96	0.96
7	0.42	0.42	0.42
8	0.56	0.56	0.56
9	0.76	0.76	0.76
10	11.38	11.38	11.38
11	11.38	11.38	11.38
12	11.39	11.39	11.39
13	GND	0	0
14	GND	0	0
15	NC	NC	NC
16	2.96	2.96	2.96
17	4.89	4.89	4.89
18	11.97	11.97	11.97

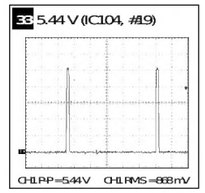
Unit: Vrms

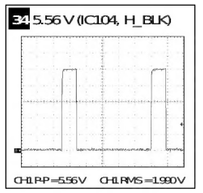
Table 13-9. IC108 (M52759SP)

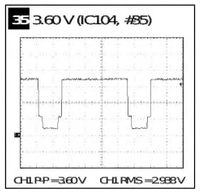
pin #	MODES		
	31.1kHz	68.1kHz	96.1kHz
1	0	0	0
2	2.36	2.36	2.36
3	2.14	2.14	2.13
4	4.96	4.96	4.96
5	0.01	0.01	0.01
6	0.01	0.01	0.01
7	7.58	7.58	7.58
8	6.03	6.02	6.02
9	6.02	6.00	5.93
10	11.67	11.67	11.67
11	2.71	2.80	2.82
12	3.87	3.98	4.06
13	1.23	1.23	1.23
14	6.93	6.93	6.93
15	0	0	0
16	0.05	0.06	0.07
17	0.40	0.71	0.94
18	0	0	0
19	6.11	6.07	6.03
20	11.69	11.69	11.69

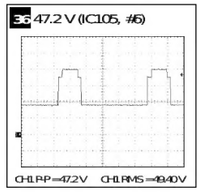
Unit: Vrms

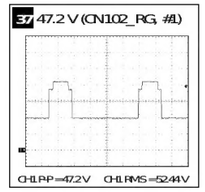


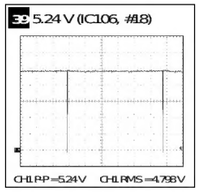


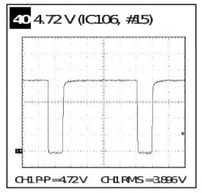


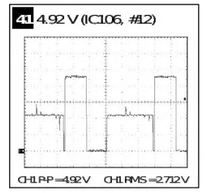


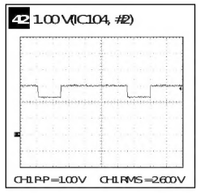


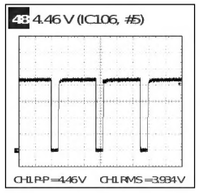


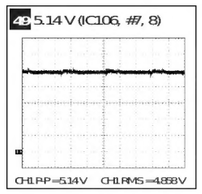


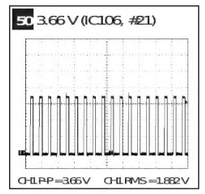


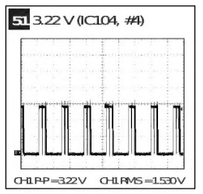












Memo